Cukurova Medical Journal
ÇUKUROVA ÜNİVERSİTESİ TIP FAKÜLTESİ

Cukurova Med J 2024;49(2):439-445
DOI: 10.17826/cumj.1463901

RESEARCH

Evaluation of the possible relationship between hemorrhoidal disease and varicocele in adult men

Erişkin erkeklerde hemoroidal hastalık ile varikosel arasındaki olası ilişkinin değerlendirilmesi

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Abstract

Purpose: Although hemorrhoidal disease and varicocele have a similar etiopathogenesis. However, the relationship between the two diseases is not well understood. Therefore, the aim of this study was to evaluate the presence of varicocele in hemorrhoid disease.

Materials and Methods: The patients included in the study were separated into two groups: the patiens with internal or external hemorrhoid (group 1, n =100) and the patients with no hemororhoid (group 2- control group, n=100). Internal hemorrhoids were classified as grade 1, 2, 3, or 4 according to the 2018 classification of the American Society of Colon and Rectum Surgeons standards committee. Then, group 1 and group 2 patients were compared in terms of varicocele frequency.

Results: Varicocele was determined at a statistically significant higher rate in the patients with hemorrhoids than in the control group. In the correlation analysis, a weak positive correlation was determined between the varicoele grade and internal hemorrhoid grade.

Conclusion: As the grade of hemorrhoid disease increased, so there was also observed to be an increase in varicocele grade. Therefore, varicocele disease must be taken into consideration in the evaluation of hemorrhoid disease.

Keywords: Hemorrhoids, varicocele, venous diseases

Öz

Amaç: Hemoroidal hastalık ve varikosel benzer bir etiyopatogeneze sahip olmasına rağmen, iki hastalık arasındaki ilişki iyi anlaşılamamıştır. Bu nedenle, bu çalışmanın amacı hemoroid hastalığında varikosel varlığını değerlendirmektir.

Gereç ve Yöntem: Hastalar iki ana gruba ayrıldı: internal veya eksternal hemoroid tanısı konulan hastalar (1. grup, 100 hasta), hemoroid tanısı konulmayan hastalar (2. grup - kontrol grup 100 hasta). İnternal hemoroidler Amerikan Kolon ve Rektum Cerrahları Derneği standartlar komitesinin 2018 sınıflamasına göre derece 1,2,3,4 olarak sınıflandırıldı. Daha sonra 1. grup ve 2. grup hastalar, varikosel sıklığı açısından karşılaştırıldı.

Bulgular: Hemoroid hastalarında varikosel, kontrol grup hastalarına göre istatistiksel olarak anlamlı derecede daha yüksek olduğu tespit edildi. Korelasyon analizinde, varikosel grade ile internal hemaroid grade arasında zayıf, pozitif yönde ilişki saptandı.

Sonuç: Hemoroid hastalığının derecesi arttıkça varikosel derecesinde de artış olduğu gözlenmiştir. Bu nedenle hemoroid hastalığının değerlendirilmesinde varikosel hastalığı da göz önünde bulundurulmalıdır.

Anahtar kelimeler: Hemoroid, varikosel, venöz hastalıklar

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Received: 02.04.2024 Accepted: 27.05.2024

INTRODUCTION

Hemorrhoid disease is a condition that develops with the obstruction of venous cushions within the anal canal. It is a common disease throughout the world, but the prevalence in the general population is not well known[1]. The most common symptom of hemorrhoidal disease is fresh blood drops seen after defecation. The other symptoms were rectal itching, swelling, a feeling of rectal fullness, fecal contamination, and pain. Prolapsed hemorrhoids may be complicated with thrombosis or strangulation, resulting in severe pain[1,2]. Although hemorrhoid disease is the most common disease in the anorectal region, the pathophysiology has still not been fully clarified. Hemorrhoid disease can occur due to weakened supportive connective tissue in the anorectal region, generally as a result of advanced age or increased intra-abdominal pressure. Therefore, the risk factors for hemorrhoid disease are conditions related to increased intra-abdominal pressure such as pregnancy, obesity, constipation, straining during defecation, sitting on the lavatory for a long time, and chronic cough[2,3,4].

Varicocele is the dilation of the venous pampiniform plexus, the etiology of which is not known. The pathogenesis has been associated with various factors that cause an increase in retrograde blood flow or increase the pressure in the pampiniform plexus vein. Varicocele is seen in 15-20% of healthy males, and at the rate of 35-40% in males requesting fertility treatment[5,6]. The prevalence has been reported at a higher rate in the older adult population[7]. The majority of varicocele patients are asymptomatic[8], and varicocele can be corrected surgically[9]. Similar to hemorrhoids and lower extremity venous dilatation, varicocele manifests with venous dilatation, and therefore, hemorrhoid and varicocele diseases share the same etiopathogenesis. It has been suggested that clinically there could be varicocele together with other systemic venous anomalies[3,10,11]. Venous diseases have been reported to affect 60% of the global general population[12].

Although the hemorrhoid status in patients presenting at hospital because of varicocele has been investigated, there are no studies in the literature that have investigated the presence of varicocele in patients presenting because of hemorrhoids. The aim of this study was to investigate the relationship between hemorrhoid and varicocele diseases. Determination of the relationship between hemorrhoid and varicocele diseases will make a valuable contribution to the clarification of the relationship between venous diseases in the literature. The hypothesis of this study was that hemorrhoid and varicocele veins are interconnected venous structures. This was based on the idea that when local disease develops in systemic venous structures in the body, venous disease could develop in another local area.

MATERIALS AND METHODS

Study design and sample

This single-center, cross-sectional study included male patients aged 18-65 years who presented at the Proctology Outpatient Clinic of Bursa Yüksek İhtisas Training and Research Hospital between October 2023 and March 2024. The study was conducted in Bursa Yüksek İhtisas Training and Research Hospital, Türkiye. After receiving approval from the Ethics Committee, patients were selected according to the study inclusion criteria. Patient information was retrieved from the archived records in the hospital information system (HBYS). The applications made to the patients in the study were performed by a general surgeon with 5 years of proctology experience, a radiology specialist who performs approximately 300 scrotal doppler ultrasongraphies per year, and a specialist physician in the field of urology.

Approval for the study was granted by the Ethics Committee of Health Sciences University Bursa Yüksek İhtisas Training and Research (decision no: 2011-KAEK-25 2023/10-01, dated: 18/10/2023). All the study procedures were in compliance with the Helsinki Declaration. Informed consent was obtained from all participants.

In the screening examination, the patients were evaluated by an experienced proctologist using anoscopy in respect of hemorrhoid or perianal diseases. Subsequently, all patients, including those in the control group, underwent rectosigmoidoscopy or colonoscopy by the same endoscopist to determine the presence and grading of internal hemorrhoids.

Following the evaluations, patients were excluded from the study if they had a history of perianal surgery, or were determined with severe cardiac disease, heart failure (ejection fraction <50%), chronic obstructive pulmonary disease, active infection in the anorectal region, ulcerative

colitis/crohn's disease, hematological malignancy, or diabetes mellitus, if they were receiving steroid treatment, or had a history of recto-anal cancer. Patients in the control group with internal hemorrhoids were also excluded from the study. In the hemorrhoid patient group, a total of 17 patients were excluded; 3 with a history of perianal surgery, 12 with diabetes mellitus, and 2 with cardiac disease. A total of 15 patients were excluded from the control group; 2 with a history of perianal surgery, 8 with diabetes mellitus, and 5 who were determined with hemorrhoid disease in rectosigmoidoscopy and colonoscopy.

Male patients aged ≥18 years who presented at the General Surgery Polyclinic with complaints of hemorrhoidal disease were included in the study.

Procedure

The patients were separated into two groups as 100 patients diagnosed with hemorrhoidal disease (Group 1) and 100 diagnosed with perianal disease (anal fissure, perianal fistula, pilonoidal sinüs, and others) (Group 2). All the patients included in the study provided written informed consent.

The grading of internal hemorrhoids was made according to the guidelines of the American Society of Colon and Rectum Surgeons (ASCRS) as follows[13];

Grade I: Evident hemorrhoidal vascularisation present with no prolapse,

Grade II: Prolapse present with the Valsalva manoeuvre, and the prolapse spontaneously decreases,

Grade III: Prolapse present with the Valsalva manoeuvre, and the prolapse can be reduced manually,

Grade IV: Chronic prolapse present, which cannot be reduced manually.

The total 200 patients included in the study were then evaluated by an experienced urologist. Scrotal inspection and palpation was performed on all the patients standing and in a supine position. The presence of varicocele was determined, and if present, grading was applied as below[14];

Grade 1: Palpable during the Valsalva manoeuvre,

Grade 2: Palpable at rest,

Grade 3: Visible and palpable at rest.

Bilateral scrotal ultrasonography was then performed by the same specialist radiologist to all the patients to confirm the diagnosis made in the physical examination.

Statistical analysis

Statistical analysis was performed using IBM SPSS version 21 software (IBM Corp., Armonk, NY, USA). The conformity of the data to normal distribution was assessed with the Shapiro-Wilk test. Descriptive statistics were stated as mean and standard deviation (minimum-maximum) or median and interquartile range (IQR 25th-75th) values as appropriate for continuous variables, and as number (n) and percentage (%) for categorical variables. In the comparisons of two groups (hemorrhoid +/hemorrhoid -) of continuous variables (age, BMI, symptom duration), the Mann-Whitney U-test was applied and non-parametric data (smoking, varicocele) were analyzed using the Chi-square test and Fisher Exact test. Kruskal Wallis test was used to compare continuous variables (age, BMI) between hemorrhoide grades. Spearman rho correlation analysis was performed to evaluate correlations. A two-tailed value of $p < 0.05$ was considered statistically significant.

Based on the study conducted by Ekici U et al. with similar methodology[15], the minimum number of patients required for this study, with an effect size of 0.51, α error of 0.05 and 95% power, was found to be 196 (98 + 98 patients for two groups).

RESULTS

The complaints of the patients with hemorrhoids on presentation at the polyclinic were bleeding in 61 cases, pain in 24, feelings of discomfort in 5, itching in 3, discharge in 1, and constipation in 6. The mean age of all the patients was 41.32±11.21 years (range, 18-65 years) (Table 1). The median age was 44 years (IQR: 36-51 years) in Group 1 and 40 years (IQR:32-47 years) in Group 2. The body mass index (BMI) in both groups was median 26 kg/m^2 (IQR: 25-28) (p=0.284). The duration of symptoms was determined to be median 21 months (IQR:6.75-72) in Group 1 and 12 months (IQR:5-24) in Group 2 (p=0.001) (Table 2).

In the comparisons between the groups of different grade hemorrhoids, the difference in age distributions

was observed to be statistically significant (p = 0.029). In the post-hoc analysis, this difference was determined to be between the Grade 4 internal hemorrhoid group and the external hemorrhoid group. The median age of the Grade 4 internal hemorrhoid group (52 [43-67] years) was determined to be significantly greater than that of the external hemorrhoid group (27.5[19.75-53.0] years) (p=0.025) (Table 3). Varicocele was determined at a statistically significant higher rate in the patients with hemorrhoids than in the control group (p=0.021). In the correlation analysis, a weak positive correlation was determined between the varicocele grade and internal hemorrhoid grade (r=+285, p=0.001) (Figure 1).

Table 1. Descriptive characteristics of the patients (n=200)

Variable	
Age (years), mean ± SD (min-max)	41.32 ± 11.21 (18-65)
BMI (kg/m2), mean ± SD (min-max)	36.62 ± 2.82 (22-37)
Anorectal pathologies, n (%)	
Hemorrhoid	100 (50%)
Anal fissure	52 (26%)
Anal fistula	30 (15%)
Pilonidal sinus	13 (6.5%)
Other	5 (2.5%)
Symptom duration (months), mean ± SD (min-max)	35.51 ± 57.59 (1-360)
Hemorrhoid classification, n	
Internal	92
External	8
Internal hemorrhoid, n (%)	
Grade 1	0
Grade 2	21 (22.8%)
Grade 3	53 (57.6%)
Grade 4	18 (19.8%)
Varicocele classification, n (%)	
Grade 1	60 (51.3%)
Grade 2	39 (33.3%)
Grade 3	18 (15.4%)
Varicocele side, n (%)	
Left	92 (78.6%)
Right	5 (4.3%)
Bilateral	20 (17.1%)

SD: Standard deviation, BMI: Body mass index, kg/m2: kilogram/square meter, min: minimum, max: maximum,

Table 2. Comparison of data between the groups

Variables	Hemorrhoid (+) (n:100)	Hemorrhoid (-) (n:100)	p value
Age (years), median (IQR)	44 (36-51)	40 (32-47)	0.052
BMI (kg/m2), median (IQR)	26 (25-28)	26 (25-28)	0.284
Symptom duration (month), median (IQR)	21 (6.75-72)	12 (5-24)	0.001
Varicocele, n (%)			
Presence	67(67%)	50 (50%)	0.021
Absence	33(33%)	50 (50%)	
Active Smoking habit, n (%)			0.568
Yes	41 (41%)	46 (46%)	
No	59 (59%)	54 (54%)	
Varicocele classification, n (%)			
Grade 1	31 (46.3%)	29 (58%)	
Grade 2	22 (32.8%)	17 (34%)	0.145
Grade 3	14 (20.9%)	4 (8%)	

BMI: Body mass index, kg/ m2: kilogram/ squared meter, IQR: Inter quarntile rang

Table 3. Comparison of demographic and clinical characteristics among patients with different stages of hemorrhoids

Variable	Grade 2 IH (n:21)	Grade 3 IH (n:53)	Grade 4 IH (n:18)	EH (n:8)	p value
Age (years), median (IQR)	43(34-53)	44(37-56.5)	52(43-67.75)	27.5(19.75-53.0)	0.029
BMI(kg/m2), median (IQR)	27(26-29)	27(25-28)	26(24-28)	25(22.5-26)	0.054
Active Smoking, n (%)	10 (47.6)	23 (43.4)	7(38.9)	1 (12.5)	0.358
Varicocele, n (%)	11 (52.4)	36 (67.9)	10(55.6)	5(62.5)	0.587

IH: Internal hemorrhoid**, EH:** External hemorrhoid, BMI: Body mass index, kg/m2: Kilogram/ metres squared, IQR: Inter quartile range

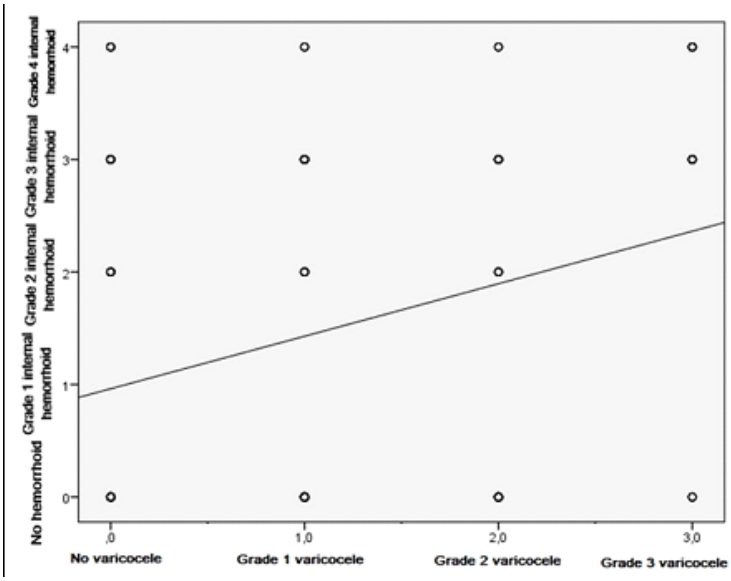

Figure 1. Correlation between the grades of varicocele and hemorrhoid.

DISCUSSION

Hemorrhoids and varicocele are two clinical conditions that are frequently seen in the general population[5,6,16]. The diagnosis of hemorrhoid disease can be made from the emergence of evident symptoms[17]. Varicocele is generally asymptomatic and diagnosed during infertilityinvestigations, and is accepted as the most common treatable cause of male infertility[18]. It has recently been thought that dilating venous disease emerges as a local symptom of systemic vascular wall pathology rather than from specific organ disease, and hemorrhoids, which is a venous dilating disease, is thought to be clinically associated with other venous diseases[10,11]. As hemorrhoids is a venous disease frequently seen in the general population and varicocele is a risk factor for infertility, the relationship between these two diseases was investigated in this study.

Previous studies have determined that the amount of collagen fibres in the intimal and medial walls of veins is increased or significantly decreased in lower extremity venous insufficiency and varicocele[19,20]. Peripheral vascular diseases and hemorrhoids have also been shown to develop together with diseases such as rectal prolapsus and pelvic relaxation, suggesting that the underlying etiology is a common connective tissue disorder[21]. Studies in literature have reported that patients with venous dilatation are predisposed to venous expansion or reflux[11,22]. Godeberge P et al. determined that the risk factors of hemorrhoids and varicose vein diseases are similar[23]. It was also deterrmined in a study that there was a relationship with hemorrhoid disease in patients with vena iliaca interna reflux[24]. In another study, pelvic vein reflux was shown to cause reflux in hemorrhoidal veins, testicular veins, and leg veins of males[25]. A significant relationship has been determined between varicocele and lower extremity

venous in insufficiency in the previous studies. Varicose vein disease has also been determined to be seen more frequently in pregnant patients with hemorrhoid disease compared to those without hemorrhoids[23,26,27]. In another study, there was reported to be an anatomic relationship between varicocele, hemorrhoids, and dilatation of the periprostatic plexus of Santorini[28]. All these studies have indicated that hemorrhoids are seen together with other venous diseases. Despite the limited number of studies, it was also determined in one study that there was no significant relationship between varicocele and hemorrhoid disease. In that study, a significant difference was observed between the groups in respect of age, BMI, and the presence of diabetes mellitus[29]. These differences may have obscured the relationship between varicocele and hemorrhoid disease, as age and weight are known risk factors for systemic vascular diseases[30,31]. In another study, in which mean age and BMI were similar in all the patients, a borderline correlation was determined between hemorrhoids and varicocele disease[10]. In the current study, there was no statistical difference in age and BMI between the two groups.

Varicocele is commonly seen in adolescents and young adults, with studies reporting prevalence of approximately 15%, ranging from 3% to 43% [6,32,33,34]. However, the prevalence has been reported at a higher rate in the adult and older population. Besiroglu H et al. reported that the prevalence of varicocele was 48% in 465 adult patients over the age of 40 years[7]. Canales et al. conducted a study including 352 patients in which the varicocele prevalence was 42.90%[35]. In the current study, the median age of the control patient group was 40 years (IQR: 32-47) and the varicocele rate was found to be 50%. Epidemiological studies have shown that age is a significant risk factor for the development of varicose veins[36]. Therefore, increasing age may be a risk factor for varicocele. Another reason why the varicocele rate (50%) in the control group of the current study cohort was higher than the rates reported in the literature may be due to the fact that the patients in the control group had anorectal disease. However, additional studies are needed to confirm this.

No study could be found in the literature that has examined varicocele status in hemorrhoid disease. Although a limited number of studies have evaluated the presence of hemorrhoids in varicocele disease, there is no comprehensive study that has compared the relationship between these two diseases. From the results of the current study, a statistically significant relationship was determined between hemorrhoid disease and varicocele. Moreover, it was observed that as the grade of hemorrhoid disease increased, so the grade of varicocele also increased. The most important limitation of this study was theits single- centre designered. Another limitation was the relatively lowsmall number of patients in the our cohort.

In conclusion, the prevalence of varicocele is higher in adult men with hemorrhoid disease than in individuals without hemorrhoids. Furthermore, there is a positive correlation between the degree of hemorrhoid disease and the degree of varicocele. Therefore, it can be recommended that male patients with hemorrhoid disease are evaluated in respect of varicocele, which is a significant cause of infertility. Nevertheless, there is a need for the findings of this study to be supported with further prospective, long-term studies with larger patient groups.

Author Contributions: Concept/Design : AKT, AG; Data acquisition: NK; Data analysis and interpretation: AKT; Drafting manuscript: AKT; Critical revision of manuscript: AG; Final approval and accountability: AKT, AG, NK; Technical or material support: NK; Supervision: AKT; Securing funding (if available): n/a.
Ethical Approval: 18.10.2023 date and 2011-KAEK from the Clinical Research Ethics Committee of SB Bursa Yüksek Ihtisas Training and Research Hospital-25 2023/10-01 ethical approval was obtained with the numbered decision.
Peer-review: Externally peer-reviewed.
Conflict of Interest: The authors have no conflict of interest to disclose.
Financial Disclosure: Authors declared no financial support

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