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Bleeding disorders in patients with hemoperitoneum due to corpus luteum cyst rupture: a retrospective analysis and screening considerations

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ABSTRACT

Aims: Hemoperitoneum due to corpus luteum cyst rupture (CLCR) can be a life-threatening condition, especially in patients with underlying bleeding disorders (BDs). Identifying the prevalence of BDs in such cases may aid in early diagnosis and management. This study aims to evaluate and determine the prevalence and role of congenital and acquired BDs in patients presenting with hemoperitoneum secondary to CLCR.

Methods: A retrospective case-control study was conducted on 81 patients with hemoperitoneum caused by CLCR, managed at our tertiary care center. The presence of BDs was assessed using the International Society on Thrombosis and Haemostasis Bleeding Assessment Tool (ISTH-BAT).

Results: Among the 81 patients, 76.5% (n=62) had an ISTH-BAT score <6, while 23.5% (n=19) had a score ≥6. Among those with an ISTH-BAT score ≥6, 7 patients (36.9%) were diagnosed with congenital or acquired BDs, with 6 having a prior diagnosis, and 1 being newly diagnosed. Compared to the ISTH-BAT <6 group, patients with a score ≥6 had lower initial hemoglobin levels (p=0.02) and higher activated partial thromboplastin time levels (p<0.001). Surgical intervention was significantly more frequent in patients with ISTH-BAT ≥6 (47.4%) than in those with a lower score (8.1%) (p<0.001), particularly among individuals with BDs.

Conclusions: This study highlights the clinical significance of the association between BDs and hemoperitoneum due to CLCR, emphasizing the importance of considering BD screening in the management of affected patients.

Introduction

Hemorrhagic corpus luteum (HCL) is a rare ovarian cyst that develops due to spontaneous bleeding within the corpus luteum after ovulation (1). The physiological rupture of follicular cysts during the menstrual cycle is generally an asymptomatic event. However, the formation of a hemorrhagic cystic lesion, resulting from bleeding within the cyst, leads to distension, increased intraluminal pressure, and potential rupture. While typically asymptomatic in healthy women, HCL can cause serious complications such as hemoperitoneum, which may require emergency medical or surgical intervention (1,2).

Corpus luteum cyst rupture (CLCR) is one of the differential diagnoses for acute abdominal pain in women of reproductive age. CLCR must be differentiated from hemorrhagic ovarian cysts, ruptured ovarian cysts, and adnexal torsion. Accurate diagnosis relies on clinical findings, test results, and careful differential diagnosis. A ruptured ectopic pregnancy must be excluded. Diagnostic evaluation includes ultrasonography, complete blood count (CBC), coagulation tests, and inflammatory markers (2).

In the evaluation of HCL, ultrasonography serves as the primary diagnostic tool. Typical sonographic findings include a round cyst with smooth, thin borders and an average diameter of 3.0-3.5 cm. The clot usually begins as an initial fibrin framework and progressively transforms into a reticular formation. Hemorrhagic effusions can be observed in the Douglas and Morrison pouches. Computed tomography (CT) is less sensitive than ultrasonography for diagnosis (2).

In women with bleeding disorders (BDs) or those undergoing anticoagulant therapy, the risk associated with HCL increases. These women may experience more severe clinical outcomes, as HCL can become more complicated and difficult to manage in such cases (3-5).

Several studies have reported an increased incidence of HCL in women with BDs such as von Willebrand disease (vWD). In one study, the incidence of ovarian cysts in women with vWD was found to be 52%, compared to 22% in the control group ($p<0.0001$) (4). Furthermore, heavy menstrual bleeding (HMB) is a common symptom among women with BDs, with prevalence ranging from 32% to 100% in women with vWD (6). HCL, however, is considered a rare but more specific finding associated with HMB. In Silwer's report, 6.8% of 136 women with vWD experienced HCL (7).

These findings highlight the clinical significance of HCL in women with BDs, emphasizing the need for accurate diagnosis of underlying conditions in such patients. The relationship between HCL and hemoperitoneum may open new avenues for management strategies. This study aims to examine the incidence of bleeding disorders in individuals presenting with hemoperitoneum due to CLCR and to provide insights that may support the improvement of early diagnostic and therapeutic approaches in this patient group.

Methods

Study design

This retrospective case-control study was conducted at the University of Health Sciences Türkiye, Gülhane Training and Research Hospital, between January 2019 and March 2023. The study included 165 patients who presented to the emergency department with abdominal pain and were subsequently diagnosed with hemoperitoneum resulting from CLCR.

Ethics committee approval

This study, was conducted following approval by the University of Health Sciences Türkiye, Gülhane Training and Research Hospital of Local Ethics Committee (approval no.: 2022/28, date: 02.03.2022). The study protocol complied with the ethical guidelines outlined in the 1975 Declaration of Helsinki and its revisions (most recently in 2013).

Informed consent

All participants provided written informed consent before enrollment. They were informed that their data would be used exclusively for research purposes, and strict confidentiality was maintained throughout the study. Names and personal identifiers were not recorded. Every stage of the study was carried out in adherence to relevant ethical guidelines and regulations.

Data collection

Clinical parameters were retrospectively extracted from the patients' medical records. These parameters included demographic data such as age, parity, symptom onset, past medical history, the laterality of the ovarian cyst, and management strategies. Most patients were admitted with an acute onset of lower abdominal pain accompanied by symptoms such as nausea, vomiting, and dizziness. On arrival at the emergency department, vital parameters-including blood pressure, heart rate, body temperature, and oxygen saturation were recorded. Additionally, comprehensive medical and surgical histories, including menstrual history, were documented. Physical examinations were conducted by a gynecologist. Laboratory tests, including CBC, activated partial thromboplastin time (aPTT), international normalized ratio (INR), platelet count, and blood group, were recorded for all patients.

Diagnostic imaging was performed through ultrasonography or abdominal-pelvic CT scans. The size and location of the ovarian cyst, as well as the volume of fluid within the pelvic cavity, were assessed using transvaginal or abdominal ultrasonography. The amount of intraperitoneal fluid varied from small collections to extensive bleeding. The diagnosis of hemoperitoneum secondary to CLCR was established through

the combination of clinical presentation, physical examination, and imaging modalities such as ultrasonography, or CT (8).

Of the initial 165 patients with hemoperitoneum attributed to CLCR, 81 patients with complete clinical and laboratory data were included in the final analysis. Patients who declined participation, those with incomplete laboratory results, or those with a posterior cul-de-sac fluid collection depth of less than 2 cm or with hemoperitoneum attributed to alternative causes (e.g., endometriosis, bleeding post-ovum retrieval for in vitro fertilization, ectopic pregnancy rupture, or suspected ovarian cyst torsion) were excluded from the study. To ensure accuracy, all diagnoses were retrospectively confirmed by a specialist gynecologist.

The management decisions were primarily based on clinical examination findings, the presence of hemodynamic instability, and the ongoing nature of the bleeding.

Bleeding scores

Informed consent was obtained from all participants through telephonic communication. A standardized telephone interview was specifically developed for this study to systematically assess the patients' medical and medication history. Participants were questioned regarding existing comorbidities, any known BDs, and the use of medications that may impact platelet function or coagulation. These medications included non-steroidal anti-inflammatory drugs, aspirin, antiplatelet agents, heparin, oral anticoagulants (both vitamin K antagonists and non-vitamin K oral anticoagulants), corticosteroids, antiepileptics, and antidepressants.

To ensure a comprehensive evaluation of BDs, the International Society on Thrombosis and Haemostasis Bleeding Assessment Tool (ISTH-BAT) was employed (9). Developed in 2010, ISTH-BAT provides a standardized approach to assessing bleeding symptoms and has been validated as a screening tool for conditions such as vWD, hemophilia, qualitative platelet disorders, and other rare BDs. The ISTH-BAT assigns a severity score ranging from 0 (absence of symptoms) to 4 (symptoms requiring medical intervention) across 14 clinically significant bleeding sites. The scoring system incorporates age- and gender-specific reference ranges, with abnormal scores defined as ≥ 6 in adult females (10).

In this study, ISTH-BAT forms were completed for all 81 participants following informed consent. The bleeding scores were calculated by a hematologist. For female participants, a total ISTH-BAT score of ≥6 was considered indicative of a potential BD.

Menstrual and obstetric histories were meticulously recorded to evaluate the presence of HMB. Patients were asked about their age at menarche, menstrual cycle patterns, duration of menstruation exceeding 8 days, prior use of iron supplementation for iron deficiency, and a history of menorrhagia. Obstetric history included details of pregnancies and incidents of postpartum hemorrhage.

To further assess HMB severity, the specific ISTH-BAT score for HMB was calculated separately. A score of 2 was indicative of moderate bleeding, necessitating medical management such as antifibrinolytic therapy, hormonal treatment, or iron supplementation. Additionally, scores of ≥2 for HMB were classified as abnormal and suggestive of clinically significant bleeding (10,11).

Laboratory assays

Laboratory evaluations are a crucial component in the screening process for BDs. However, a universally accepted screening panel for the exclusion of BDs in women presenting with abnormal bleeding, such as menorrhagia, postpartum hemorrhage, or HMB, has not yet been established. Current guidelines suggest that initial laboratory tests should include a CBC to evaluate hemoglobin levels and rule out thrombocytopenia (12).

Baseline coagulation studies, including prothrombin time and aPTT, are commonly recommended, even though these tests lack sensitivity and specificity for diagnosing BDs. Additional assays, such as thrombin clotting time for qualitative fibrinogen defects and clottable fibrinogen levels for quantitative defects, can provide further insights into fibrinogen abnormalities.

For vWD screening, specific tests include von Willebrand factor antigen (vWF:Ag), Ristocetin Cofactor activity (vWF:RCo), and Factor VIII activity (FVIII:C) (13). In this study, these assays were performed for participants with ISTH-BAT scores ≥6. Results for FVIII:C, vWF:Ag, and vWF:RCo levels, as well as fibrinogen levels, were documented for this subset of patients.

The diagnosis of vWD was established based on reduced levels of vWF:Ag, vWF:RCo, and FVIII:C. The diagnostic threshold was defined as vWF:Ag and vWF:RCo levels below 0.50 IU/mL, in accordance with established criteria (12,13).

Statistical Analysis

We used IBM SPSS Statistics version 26 (IBM Corp., Armonk, NY, USA) to perform statistical analyses. Descriptive data were summarized as frequency, percentage, mean ± standard deviation, and range (minimum-maximum), depending on the variable type. To assess whether the data followed a normal distribution, the Kolmogorov-Smirnov and Shapiro-Wilk tests were applied. For normally distributed variables, differences between two independent groups were analyzed using the Student's t-test. The Mann-Whitney U test was applied for non-normally distributed continuous variables, whereas categorical data were examined with the chi-square test. A p-value below 0.05 was accepted as indicating statistical significance.

Results

This study included 81 women diagnosed with hemoperitoneum due to CLCR. Of these, 19 (23.5%) were in the ISTH-BAT score ≥6 group, and 62 (76.5%) were in the ISTH-BAT score <6 group. The mean age was 28.79±7.26 years (range: 15-45), and the mean parity was 0.58±0.49 (range: 0-1). No significant differences in age or parity were found between the groups (p=0.345 and p=0.605, respectively). Ovarian cysts were more common in the left ovary than the right in both ISTH-BAT <6 and ≥6 groups [15 (78.9%) vs. 33 (53.2%), p=0.049]. Clinical characteristics are summarized in Table 1.

The most frequently reported symptoms were recurrent skin and oral mucosal bleeding, menorrhagia, and recurrent epistaxis, listed in order of frequency. These symptoms were observed both in the general population and in the group with BDs. However, in patients with ISTH-BAT scores ≥6, nasal and skin bleeding were reported at a higher frequency. In patients diagnosed with BDs, nasal and skin bleeding (scores ranging from 1-4) was reported in all cases.

Two patients had a history of epilepsy, while one had Takayasu arteritis, and another had immune thrombocytopenia. All of these patients had ISTH-BAT scores <6 and were managed conservatively.

In terms of HMB-specific scores, 12 (63.1%) women in the ISTH-BAT ≥6 group had scores ≥2, compared to none (0%) in the ISTH-BAT <6 group (p<0.001) (Table 1). The most commonly reported symptom was heavy and prolonged menstrual bleeding.

Table 2 presents laboratory findings for the ISTH-BAT ≥6 and ISTH-BAT <6 groups. The aPTT level was significantly higher in the ISTH-BAT group ≥6 (30.7±7.96 vs. 25.9±2.91, p<0.001), while hemoglobin levels were lower in this group (11.1±2.22 vs. 12.1±1.39, p=0.02). No statistically significant differences were found for INR or platelet count.

In the ISTH-BAT <6 group, 5 patients (8.1%) underwent surgery, while, in the ISTH-BAT ≥6 group, 9 patients (47.4%) underwent surgery (p<0.001). Of the 81 patients, 14 (17.3%) underwent laparoscopic surgery for ovarian cysts (Table 1). Two patients had a history of previous surgical interventions due to ruptured ovarian cysts (Cases 2 and 3). Both cases, including the most recent episode of hemoperitoneum, were managed conservatively (Table 3). All surgeries preserved the ovaries. Additionally, one patient required surgery for a suspected case of acute appendicitis.

Of the 19 patients in the ISTH-BAT ≥6 group, 13, without a diagnosed BD, were referred for further testing. Four of these 13 women missed their follow-up visits. vWD analysis and fibrinogen testing were performed on 9 patients (Cases 7-15). Fibrinogen levels were within the normal range in all cases, and no evidence of dysfibrinogenemia was found (Table 4). One patient showed low levels of vWF:Ag, vWF:RCo, and FVIII:C, leading to a diagnosis of vWD (Table 4).

Six patients reported a previous history of BDs (Cases 1-6; Table 3). Two of these patients were known to have vWD; one was a cardiac surgery patient on chronic coumadin therapy with a prosthetic valve; one had been diagnosed with Glanzmann thrombasthenia (GT) in childhood; one had a history of congenital Factor V deficiency; and one was in the pancytopenic phase following acute myeloid leukemia chemotherapy. Treatments used to manage these bleeding episodes included tranexamic acid, hormonal therapy, platelet transfusion, vWF-containing plasma-derived FVIII concentrate, and fresh frozen plasma (FFP) (Table 3).

Table 1. Demographic and clinical characteristics of the patient in both groups.

Variables		ISTH-BAT score <6 n=62, (76.5%)	ISTH-BAT score ≥6 n=19 (23.5%)	p
Age (years) (mean ± SD)		28.41±6.78	30.00±8.72	0.345
Parity, n (%)	**Nulliparous n(%)**	27 (43.5)	7 (36.8)	0.605
	Multiparous, n(%)	35 (56.5)	12 (63.2)	
Site of ovarian cyst	**Right, n (%)**	33 (53.2)	15 (78.9)	**0.049**
	Left, n (%)	29 (46.8)	4 (21.1)	
HMB-specific scores	**0**	48 (77.4)	4 (21.1)	**<0.001**
	1	14 (22.6)	3 (15.8)	
	>2*	0	12 (63.1)	
Management	**Conservatively**	57 (91.9)	10 (52.6)	**<0.001**
	Surgery	5 (8.1)	9 (47.4)	

*The difference is due to this line with asterisk, p-values < 0.05 are shown in bold
% frequency; ISTH-BAT: International Society on Thrombosis and Haemostasis Bleeding Assessment Tool HMB: Heavy menstrual bleeding

Table 2. Laboratory testing in both groups

Laboratory test	All case (n=81)		ISTH-BAT score <6 (n=62)		ISTH-BAT score ≥6 (n=19)		P
	Mean ± SD	Min-Max	Mean ± SD	Min - Max	Mean ± SD	Min-Max	
Hemoglobin, g/DL	11.8±1.66	5.2-14.8	12.1±1.39	8.4-14.4	11.1±2.22	5.2-14.8	**0.02***
Platelet, 10^3/µL	246.1±69.90	107-435	243.7±1.53	107-435	254.1±52.22	170-359	0.58*
INR	1.1±0.34	0.9-4	1.0±0.01	0.9-1.5	1.2±0.68	0.9-4	0.21**
aPTT (sec)	27.0±4.99	20.6-55.4	25.9±2.91	20.6-33.3	30.7±7.96	21.3-55.4	**0.001****

*:T test applied, **: Mann-Whitney U Test applied.
ISTH-BAT: International Society on Thrombosis and Haemostasis Bleeding Assessment Tool, aPTT: Activated partial thromboplastin time, INR: International normalized ratio

Table 3. Characteristics of 19 cases with ISTH-BAT score ≥6

Case no.	Bleeding disorder	Age	ISTH-BAT score	HMB-specific scores	Blood group	Platelet (/mm^3)	aPTT (sec)	Site of ovarian cyst	Treatment	Medication used to controlled bleeding event
1	Coumadin Therapy	30	6	0	A^+	250	55.4	Right	Conservative	FFP
2	vWD	36	9	2	A^-	267	21.8	Right	Conservative (Past LS)	VWF-containing plasma-derived FVIII concentrate
3	GT	41	25	1	B^+	170	32	Right	Conservative (Past LS)	Platelet transfusion
4	VWD	29	16	2	B^-	359	25	Right	LS	VWF-containing plasma-derived FVIII concentrate
5	Factor V Deficiency	18	15	3	A^+	217	31	Right	LS	FFP
6	AML	25	8	1	0^+	276	46	Right	Conservative	Platelet transfusion
7	VWD*	31	8	0	A^+	294	33.8	Right	LS	
8		18	6	0	A^+	227	29.9	Left	Conservative	
9		19	6	2	B^+	185	30.6	Right	Conservative	
10		43	6	2	0+	274	29	Right	Conservative	
11		24	7	2	B^+	243	29.7	Left	Conservative	
12		30	13	1	B^-	196	23.8	Left	LS	
13		22	10	2	AB^+	303	28.7	Right	Conservative	
14		31	10	2	A^+	248	26	Left	Conservative	
15		33	6	2	A^+	214	30	Right	LS	
16	N/A	45	7	4	0-	289	21.3	Right	Conservative	
17	N/A	43	6	0	0^+	319	30.6	Right	LS	
18	N/A	20	6	2	0^+	313	29.3	Right	Conservative	
19	N/A	32	6	2	B^+	183	29	Right	LS	

*:New case
ISTH-BAT: International Society on Thrombosis and Hemostasis, HMB: Heavy menstrual bleeding score, aPTT: Activated partial thromboplastin time, vWD: von Willebrand disease, GT: Glanzmann thrombasthenia, AML: Acute myeloid leukemia, GT: Glanzmann thrombasthenia, FFP: Fresh frozen plasma, LS: Laparoscopy, N/A: Not applicable

Table 4. Further laboratory results of patients with an ISTH-BAT score ≥6 without a diagnosed bleeding disorder (n=9)

Laboratory test (case 7-15)	Mean ± SD	Min-Max
Hemoglobin, g/dL	12.00±1.88	9.00-14.80
Platelet, 10^3/μL	242.66±41.61	185.00-303.00
INR	1.05±0.07	0.90-1.10
aPTT (sec)	29.00±2.76	23.80-33.30
Factor VIII level	81.88±13.92	64.00-104.00
vWF Ag	99.55±24.64	67.00-136.00
vWF Rco	140.16±177.48	50.00-607.00
Fibrinogen (mg/dL)	293.55±109.37	174.00-558.00

ISTH-BAT: International Society on Thrombosis and Haemostasis Bleeding Assessment Tool, INR: International normalized ratio, aPTT: Activated partial thromboplastin time, vWF Ag: von Willebrand factor antigen, vWF Rco: von Willebrand factor ristocetin cofactor

Discussion

This study investigates the prevalence and clinical impact of BDs in women presenting with hemoperitoneum due to CLCR. Congenital or acquired BDs are known to lead to significant gynecological complications in women of reproductive age, including HMB, miscarriages, and postpartum hemorrhage. However, the role of hemostasis in reproductive hemorrhages is often overlooked, which can delay diagnosis and treatment. The primary aim of this study was to evaluate the prevalence of genetic and acquired BDs in women who developed hemoperitoneum due to CLCR and to assess the potential utility of the ISTH-BAT as a diagnostic screening tool.

Gynecologists often encounter bleeding disorder symptoms in adolescents, yet awareness of these disorders remains insufficient. A study involving 75 women with vWD found that the most frequently reported symptom was menorrhagia (84%), and the average time from the onset of the first symptom to diagnosis was 16 years (14). In a survey, 77% of obstetricians and gynecologists considered BDs a potential cause of menorrhagia in adolescents, whereas only 38.8% did so in reproductive-aged women (15). This underscores the insufficient investigation of BDs and the lack of hematologic referrals, emphasizing the need for systematic screening to facilitate early diagnosis and management.

Although the true incidence of ruptured ovarian cysts remains unclear, this condition is common, particularly among young women, and more frequent in BDs (16). A study of 102 women with vWD reported ovarian cysts in 52%, compared to 22% in controls (8). vWD, the most prevalent inherited BD in reproductive-aged women, affects 1 in 100 individuals (17,18). Thus, vWD should be considered in cyst rupture cases, especially with abnormal bleeding. In our study, 3 of 81 patients had vWD, aligning with the reported prevalence (0.44-1%) in Türkiye, though findings should be interpreted cautiously due to the small sample size (19).

In women of reproductive age, benign etiologies such as ovulation, retrograde menstrual flow, and endometriosis are among the frequent causes of hemoperitoneum. These bleeding events often resolve spontaneously without the need for intervention. However, when hemoperitoneum is persistent or severe, a broader differential diagnosis should be considered, and potentially life-threatening etiologies should be taken into account. The literature on gynecological cases of hemoperitoneum suggests that most of these cases occur in patients with BDs and are related to ovarian cyst rupture. Hemorrhagic ovarian cysts are associated with various coagulopathies, including different types of vWD (types 1, 2A, 3), afibrinogenemia, GT, hemophilia A, hemophilia B, and deficiencies in factor X and factor XIII. Furthermore, cases of hemoperitoneum have been reported in patients receiving anticoagulant therapy due to antiphospholipid antibody syndrome (2). Our findings support the potential link between BDs and hemoperitoneum caused by CLCR; 23.5% of patients in our study had an ISTH-BAT score indicating an increased likelihood of a BD (≥6). Moreover, 36.9% of patients in this subgroup were diagnosed with genetic or acquired BDs, highlighting the importance of considering these conditions in the clinical management of hemoperitoneum associated with CLCR.

Jarvis and Olsen (20) reported on cases of type I vWD presenting with recurrent hemorrhagic ovarian cysts and recommended that coagulation studies be conducted even in the absence of menorrhagia or a known history of BDs. However, systematic screening for potential BDs is not a common practice in gynecological settings. Structured history-taking and screening processes to evaluate underlying BDs could prevent unnecessary surgical interventions in patients with undiagnosed BDs and provide an opportunity for appropriate treatment.

The necessity of routine BD screening in hemoperitoneum due to CLCR remains debated. Evaluating suspected BDs is challenging and requires a detailed bleeding history and a BAT assessment. A high BAT score indicates an increased BD likelihood, supported by the literature (21,22). In our study, 36.9% of patients with ISTH-BAT ≥6 were diagnosed with a BD, highlighting the importance of screening in those with abnormal bleeding histories.

Coordinated management involving hematology can facilitate effective medical treatment and prevent recurrent cyst ruptures in patients with BDs. Our study demonstrated that patients with an ISTH-BAT score ≥6 or a diagnosed BD exhibited higher incidences of severe hemoperitoneum and hemodynamic instability, necessitating more extensive surgical interventions and blood transfusions. However, those receiving multidisciplinary care, including tranexamic acid, factor replacement, cryoprecipitate, and FFP, frequently achieved resolution of hemorrhagic events without the need for surgical

intervention. Surgical intervention should be reserved as a last resort, only when hemostatic therapy proves inadequate, and with sufficient perioperative support to minimize potential complications (1,2,23).

The retrospective nature and small sample size of this study limit its generalizability. Although ISTH-BAT is a useful screening tool, further confirmatory tests, such as vWF levels and coagulation assays, are needed. Larger prospective studies with more extensive cohorts are required to confirm the role of routine BD screening in the management of CLCR-related hemoperitoneum and to explore the potential for early intervention in high-risk populations.

This study has several limitations. First, its retrospective design limits causal inference and may introduce bias. Second, the relatively small sample size reduces statistical power. Third, the study being conducted in a single tertiary center may restrict the generalizability of the findings. Despite these limitations, the study provides valuable insights into the association between BDs and hemoperitoneum due to CLCR.

Conclusion

In conclusion, this study supports the hypothesis that BDs may play a significant role in the pathogenesis and management of hemoperitoneum caused by CLCR. The findings highlight the potential value of routine BD screening in patients with unexplained hemoperitoneum, especially those with abnormal bleeding histories or high bleeding scores. Early detection and appropriate management of these disorders could improve patient outcomes and prevent the need for invasive interventions.

Ethics

Ethics Committee Approval: University of Health Sciences Türkiye, Gülhane Training and Research Hospital of Local Ethics Committee (approval no.: 2022/28, date: 02.03.2022).

Informed Consent: Written informed consent was obtained from all participants included in the study.

Footnotes

Authorship Contributions

Surgical and Medical Practices: A.T.A., M.Y., G.E.Y.C., Ö.Ö., K.E.K., Concept: A.T.A., M.Y., Design: A.T.A., M.Y., Y.E.B., Data Collection or Processing: A.T.A., M.Y., G.E.Y.C., Analysis or Interpretation: A.T.A., Y.E.B., Literature Search: A.Y.A., Ö.Ö.., K.E.K., Writing: A.T.A.

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