Analysis of the related factors of deep vein thrombosis after gynecological tumor surgery

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Abstract: Objective To investigate the risk factors of deep vein thrombosis (DVT) in patients after gynecological tumor surgery. Methods From March 2014 to March 2024, 57 patients with deep vein thrombosis after surgical treatment in the Department of Oncology and gynecology of our hospital were selected as the research sample, and were included in the observation group. In addition, 55 patients without deep vein thrombosis after gynecological tumor surgery were included in the control group. The clinical data of the patients were collected, and the related factors of postoperative deep vein thrombosis were analyzed. Results Univariate analysis showed that age, BMI, operation time, operation range, hypertension and diabetes, platelet count, benign and malignant tumor, preoperative fluid infusion were related to the occurrence of postoperative deep vein thrombosis ($P < 0.05$). Multiple regression analysis showed that age > 40 years, BMI>25 kg/m2, malignant tumor, hypertension and diabetes, platelet count > 300×109/L were independent risk factors for postoperative DVT, while preoperative fluid infusion was a protective factor for postoperative DVT. Conclusion Age, BMI, malignant tumor, combined cardiovascular technology and platelet count are related to the occurrence of deep vein thrombosis after gynecological tumor surgery, and no preoperative fluid infusion is a protective factor.

Keywords: Gynecologic Tumor; Postoperative Deep Vein Thrombosis; Influencing Factors

The formation of deep vein thrombosis is mainly attributed to the slow speed of blood flow and the hypercoagulable state of blood. It mostly occurs in the deep vein, and its adhesion to the vessel wall is relatively weak, so there is a high risk of shedding. Once it falls off, it may embolinate other parts, resulting in serious consequences [1]. The occurrence of lower extremity deep vein thrombosis is usually associated with damage to the vascular endothelium, slow blood flow, and hypercoagulation. According to relevant studies, the incidence of deep vein thrombosis of lower limbs after gynecological tumor surgery in foreign countries is between 7% and 45%. In contrast, the incidence of deep vein thrombosis of lower extremities after malignant tumor surgery in our country is low, which is 1%-11% [2]. However, it is worth noting that the incidence of deep vein thrombosis in our country shows an increasing trend year by year. In view of the potential threat of deep vein thrombosis to the health of patients after gynecological tumor surgery, it is necessary to deeply explore its related factors, so as to take effective preventive measures in clinical practice, so as to reduce the incidence of this complication and ensure the life safety of patients. Therefore, this paper mainly analyzes the factors related to the occurrence of deep vein thrombosis after gynecological tumor surgery, and is reported as follows.

1. Data and methods

1.1 General Information

A total of 57 patients with deep vein thrombosis after surgical treatment in the Department of Oncology and gynecology of our hospital from March 2014 to March 2024 were selected as the research sample and were included in the observation group. In addition, 55 patients without deep vein thrombosis after gynecological tumor surgery were included in the control group. The age of patients in the observation group was 38-70 years old, with an average age of (46.81±5.27) years old. The age of the control group was 35-70 years old, with an average age of 45.37±5.14 years old. Inclusion criteria: (1) All patients in the observation group had deep vein thrombosis for the first time; (2) All patients in the control group were confirmed to have no lower extremity venous thrombosis before surgery and no previous coagulopathy-related diseases. (3) Patients with high compliance to treatment. Exclusion criteria: (1) patients with abnormal immune function; (2) distant

metastasis; (3) patients with incomplete clinical data; (4) Patients with mental illness or cognitive impairment who cannot communicate with each other normally.

1.2 Research Methods

The patient's age, BMI, comorbidities, tumor benign or malignant, preoperative fluid infusion and the location of thrombosis were obtained through the patient's medical records. The operation time and scope of the patient were determined through the surgical records and recorded. One day before the operation, the patient's fasting blood was taken, and the blood analyzer was used for platelet count detection to obtain the patient's platelet count value. The indexes of the two groups were compared and analyzed.

1.3 Statistical data analysis

SPSS 26.0 software was used for data processing, measurement data were displayed in the form of $(x \pm s)$, and t test was used for comparative analysis between different groups. For count data, percentage (%) was used as the expression, and the differences between groups were compared by 2 test, and the binary logistic regression model was established for influencing factors. In this study, differences were considered statistically significant if $P < 0.05$.

2. Results

2.1 Univariate regression analysis of two groups of patients

Univariate analysis showed that age, body mass index, operation time, operation scope, hypertension and diabetes, operation scope, platelet count, benign and malignant disease, and preoperative fluid infusion were all related to the occurrence of postoperative deep vein thrombosis ($P < 0.05$).

Table 1 Single factor analysis results of the two groups of patients [n, %]

Group		Observation group （n =57）	Control group （n=55）	P value
Age	＞ 40 岁	47(82.46%)	33(60.00%)	0.047
	＜ 40 岁	10(17.54%)	22(40.00%)	
BMI	＞ 25 kg/m2	40(70.17%)	28(50.91%)	0.012
	＜ 25 kg/m2	17(29.82%)	27(49.09%)	
History of disease	diabetes	24(42.11%)	11(20.00%)	0.024
	hypertension	22(38.59%)	10(18.18%)	
Nature of tumor	benign	18(31.58%)	34(63.63%)	0.034
	恶性	39(68.42%)	21(38.18%)	
Whether to rehydrate before surgery	is	9(15.78%)	34(61.81%)	0.027
	no	48(84.21%)	21(38.18%)	
Time of operation	＞ 1h	41(71.93%)	18(32.73%)	0.038
	＜ 1h	16(28.07%)	37(67.27%)	
Range of operation	Lymph node dissection ＞ 45	36(63.16%)	16(29.09%)	0.007
	Lymph node dissection ＞ 45	21(36.84%)	39(70.90%)	
Platelet count ＞ 300×109/L		13(22.80%)	43(78.18%)	0.004

2.2 Multivariate regression analysis

Multivariate Logistic regression analysis showed that advanced age, obesity, hypertension, diabetes and other diseases, platelet count more than 300×109/L were independent risk factors for deep vein thrombosis. Preoperative fluid infusion can effectively prevent deep vein thrombosis, and the interaction effect has no effect (OR=0).

Table 2 Results of multivariate analysis [n, %]

Influencing factors	Multivariate Logistic regression analysis		
	OR	95%CI	P 值
Age	1.57	1.06-2.68	0.034
BMI>25 kg/m2	1.27	1.12-1.54	0.006
Malignant tumor	2.24	1.15-2.85	0.027
hypertension	2.45	1.24-2.47	0.029
diabetes	1.32	1.59-2.04	0.042
Platelet count ＞ 300×109/L	0.95	0.92-1.45	0.041
Preoperative fluid infusion	0.32	0.12-0.55	0.001

3. Discussion

After deep vein thrombosis, only a few patients can be cured or stable. However, if it is not detected and properly treated in time, the thrombosis in most patients may flow to the main blood vessels with the blood, and then evolve into thrombosis sequelae, which seriously interferes with the daily life of patients, and even threatens their life safety. In the results of this study, advanced age, obesity, combined with hypertension, diabetes and other diseases, and platelet count over 300×109/L were independent high risk factors for deep vein thrombosis. The older the age, the higher the risk of thrombosis, which is related to the poor activity endurance of the elderly and the aging of blood vessels, muscles and other functions. However, obesity has obvious changes in the coagulation system of patients, which will promote the significant rise of related coagulation indicators [3]. The combination of hypertension and diabetes will increase the peripheral vascular resistance of patients, change the blood flow status, and have a significant impact on the formation of deep vein thrombosis. At the same time, patients with malignant tumors have highly active expression of procoagulation-related factors, and platelets play an important role in the process of blood coagulation, both of which are related to the formation of deep vein thrombosis. Lack of preoperative fluid supplementation will lead to insufficient blood volume, resulting in blood concentration, increased fibrinogen, and blood hypercoagulation. Therefore, preoperative fluid supplementation is a protective factor for the occurrence of deep vein thrombosis.

In conclusion, the occurrence of deep vein thrombosis after gynecological tumor surgery is related to age, malignant tumor, hypertension and diabetes, and platelet count. Preventive measures can be taken for these factors in clinical practice。

References

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