

Prevention and Management of Deep Vein Thrombosis in Patients after Spinal Orthopedic Surgery

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Abstract: Objective: to apply the best evidence of prevention and management of deep vein thrombosis after spinal surgery to clinical practice and reduce the incidence of deep vein thrombosis in patients. Methods: A total of 30 nursing staff and 150 patients in Spine Trauma Orthopedics Department of our hospital were selected. Following the clinical application model of JBI evidence in Australia, the best evidence for the prevention and management of deep vein thrombosis in patients after spine surgery was retrieved and summarized, and review indicators were formulated. The implementation effect was judged through baseline review before evidence application, practical change and review after evidence application. Results: After the application of evidence, the scores of knowledge about prevention and management of DVT among medical staff were significantly increased, including basic knowledge, evaluation, prevention and treatment knowledge. The comparison before and after the application of evidence was statistically significant. After application of the evidence, the assessment of bleeding risk and assessment of surgical position and tourniquet use increased from 0 to 100%, D- dimer examination from 0 to 97.3%, mechanical prevention from 2 to 92%, and drug prevention to 38.7%, preoperative and postoperative and discharge mission implementation rate increased significantly, in more than 98%, the difference was statistically significant; The incidence of DVT before evidence was 2.85% and the incidence of DVT after application was 0. Conclusion: the application of the best evidence of prevention and management of deep venous thrombosis can improve the level of prevention and management of deep venous thrombosis of medical staff, standardize prevention and management behavior, and reduce the incidence of deep venous thrombosis in patients.

1. Introduction

Spinal surgery is complex. Affected by factors such as anesthesia method, operation time, application of tourniquet, and prone position during operation, patients may suffer from venous blood reflux becoming slow^[1]. Endovascular damage caused by spinal implants, stress response, and surgical trauma increases the risk of deep vein thrombosis (DVT), which is one of the serious complications after orthopedic surgery. In recent years, with the continuous improvement of the technology and difficulty of spinal surgery, postoperative DVT and pulmonary embolism are still one of the common and dangerous complications after spinal surgery^[2]. Most patients in spine

surgery need to stay in bed for a long time, and some of them are accompanied by nerve injury, which further increases the risk of thrombosis. Moreover, the understanding of DVT in spine surgery patients is still insufficient, making spine surgery become one of the risk factors for DVT. The prevention and management of thromboembolic disease is of paramount importance during the perioperative period of spinal surgery^[3].

2. Data and Methods

1.1 General data: There are 30 nursing staff and 9 doctors in the Department of Orthopedics and Spine Trauma of our hospital. There were 4 males and 26 females as nurses. The age ranged from 24 to 41 (32.59 3.14) years old. There were 6 male doctors and 3 female doctors. Age 27-43(35. 24 3.65) years old. A total of 150 patients (88 males and 62 females) were included before and after evidence application. Age ranged from 18 to 65 (46.79 4.56) years old. There was no significant difference in general data of patients before and after application of evidence (all $P > 0.05$).

2.1 Methodology

In this study, the best evidence-based nursing practices, including baseline review before evidence application, practice changes and effect evaluation after evidence application, were implemented in Spine journal of nursing science No.19 12 Traumatic Orthopedic Ward, Vol. 34, Oct. 2019 from May to November 2018 according to the Australian Joanna Briggs Sinstitute (JBI) Evidence Clinical Application Model^[4].

2.1.1 Analysis of Obstacles and Implementation of Improvement Strategies

Lack of awareness and strategies among health care personnel regarding evidence-based prevention and management of DVT in 1.2.1.1 Health care personnel are not fully aware of the latest evidence-based prevention and management of DVT in the daily management of DVT care. Countermeasures: A quality team with department director, medical team leader and head nurse as the core was established. According to the interview results of the training needs for thrombosis prevention and management, special trainings on DVT prevention and management were organized and carried out. The application of this evidence was included in the pre-service training plan, and all new medical staff were required to carry out corresponding training and learning, so as to fully implement the content of DVT prevention and management. ① Formulate DVT prevention and management training program. Organized by the quality group project training, in the form of PPT teaching, 1 h each time, a total of grant

Lectures were given five times, and the lecture with the same content was repeated once to ensure that all health care personnel received training. The lectures included basic knowledge of DVT, detailed explanation of standardized use of CAPRINI scale, prevention and management measures for patients with different risk levels, evaluation and judgment of bleeding risk, use of mechanical prevention tools, and training on subcutaneous injection skills of low molecular heparin^[5]. ② the production of medical practice manual. The content includes the use of risk assessment table, basis, machine. The use of mechanical and drug prevention measures, observation and care of patients with DVT, health education related content, etc. For patients with extremely low risk (0 score) of VTE, basic prevention was carried out: water intake+infusion volume > 2000 mL/d; Sitting on the bed for 30–45 on the day of operation; On the first day after surgery, patients sat up 45–90 on the bed and stood beside the bed for 3 times/d and 5–10 times/min. On the second day after surgery, patients were supported in the ward for 3 times/d, 5–10 times/min, and then gradually increased so as not to feel tired. Mechanical prevention was preferred for patients with

low risk (1–2 points): patients with lower extremity paralysis were treated with intermittent pneumatic compression device 2–3 times/d, 30 min/time; other patients wore elastic socks > 18 h/d, supplemented by basic prevention and increased ankle pump movement 3–4 times/d, 20–30 groups/time, leg stretching exercise 2–3 times/d, 10 groups/time, and contraction 10 times as one group. Patients with medium risk (3–4 points), high risk (≥ 5 points) and high risk of hemorrhage only received the above basic and mechanical prevention, while patients without high risk of hemorrhage received additional drug prevention: 4000 U low-molecular-weight heparin was injected subcutaneously, 1–2 times/d^[6]. ③ making small teaching videos. Include ankle pump motion, quadriceps contractile motion, that use of intermittent pneumatic compression device, the use of stretch socks, and a demonstration of subcutaneous injection of low molecular heparin^[7]. ④ Questionnaire survey was conducted after the training to understand the grasp of the medical staff, and the training and assessment results were included in the performance management^[8].

1.2.1.2 lacks the evaluation content of bleeding risk and surgical patients. Countermeasures: ① Increase the content of bleeding risk evaluation, introduce the bleeding risk evaluation form by consulting literature, and train doctors on the use of the evaluation form to ensure the correct use of the bleeding risk evaluation form^[9]. ② Clear responsibilities, nurses should assess the risk of thrombosis when patients are admitted to hospital and when their condition changes, and doctors should assess the risk of bleeding when patients are admitted to hospital and before drug prevention; On the same day, the nurses in the operating room evaluated the operation time, patient's position and tourniquet usage, etc., and the patients returned to the ward after operation and were evaluated by the medical staff again^[10]. ③ Strengthen quality control. Every day, the quality team members randomly evaluate the effect of patients and supervise the quality of education according to the self-designed checklist.

1.3 Re-examination after Evidence Application After 2 months of evidence application and practice reform measures, the quality examination of DVT prevention and management practice was conducted again (30 medical staff and 150 patients). Review tools and methods are the same as baseline review.

1.4 evaluation methods ① awareness of DVT prevention and management knowledge of medical staff. Based on the evidence content, a self-designed questionnaire with 50 questions, with a total score of 100 points, including fill-in-the-blank questions and multiple-choice questions on DVT foundation, evaluation, prevention and treatment knowledge, was used to investigate 30 medical staff before and after the evidence application. ② Implementation of evidence-based DVT prevention and management by medical staff. Including bleeding risk assessment, D-dimer examination, mechanical and drug prevention, etc. During the application of evidence, a checklist for DVT prevention and management was designed based on the best evidence to check the implementation of evidence by medical staff, with “√” indicating success and “×” indicating failure. ③ occurrence of DVT. Compare the incidence of DVT before and after evidence application.

2.2 Statistical Methods

T-test and χ^2 -test were carried out by SPSS 23.0 software, and the test level $\alpha = 0.05$.

3. Results

3.1 Comparison of Knowledge Scores of Dvt Prevention and Management among Health Care Personnel Before and after Evidence Application

After the application of evidence, the scores of knowledge about prevention and management of DVT among medical staff were significantly increased, including basic knowledge, evaluation, prevention and treatment. The differences before and after the application of evidence were statistically significant ($P < 0.05$) as shown in Table 1.

Table 1 Comparison of Scores of Knowledge about Prevention and Management of Dvt among Medical Staff Before and after Application of Evidence (Score, \bar{X} s)

TIMIE	total number of people	basic knowledge	Evaluate knowledge	Prevention knowledge	Treatment Knowledge
Before the application of evidence	150	21.05±15.36	12.59±8.45	18.23±15.98	16.32±10.23
After the evidence is applied	150	26.78±9.83	16.98±4.75	27.88±10.67	18.99±7.59
T		3.687	4.588	3.678	3.087
P		0.001	0.001	0.000	0.003

3.2 Comparison of Implementation of Dvt Prevention and Management among Health Care Personnel Before and after Evidence Application

After application of the evidence, the assessment of bleeding risk and assessment of surgical position and tourniquet use increased from 0 to 100%, D- dimer examination from 0 to 97.3%, mechanical prevention from 2 to 92%, and drug prevention to 38.7%, preoperative and postoperative and discharge mission implementation rate increased significantly, all in more than 98%, the difference was statistically significant (Table 2).

Table 2 Comparison of Implementation of Dvt Prevention and Management among Health Care Personnel Before and after Evidence Application (Case%)

TIME	Number of cases	Bleeding risk assessment	Surgical posture and evaluation of tourniquet use	D-dimer test	Mechanical prevention	Drug prevention	Preoperative health education	Postoperative health education	Discharge Health Education
Before the application of evidence	150	0(0)	0(0)	0(0)	3(2)	0(0)	45(30)	89(59.3)	76(50.7)
After the evidence is applied	150	150(100)	150(100)	146(97.3)	138(92)	58(38.7)	149(99.3)	148(98.7)	150(100)
X ²		145	145	133	130.23	56.344	68.325	65.236	17.455
P		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

3.3 Dvt Before and after the Application of Evidence

The incidence of DVT before evidence was 2.85% and the incidence of DVT after application was 0.

4. Discussion

3.1 The application of best evidence can improve the cognitive level of DVT of medical staff. It has been reported that the cognitive level of DVT of medical staff will directly affect the prevention, observation and treatment of DVT, and ultimately affect the prognosis of patients. At present, there is a certain theoretical basis for studying DVT after spinal surgery at home and abroad, but the lack of prevention strategies and clinical application standards based on evidence-based theory is not conducive to the process monitoring and quality management in DVT prevention management, thus affecting the promotion of DVT prevention and nursing work. This study follows the clinical application mode of JBI best evidence, and summarizes and introduces the latest clinical guidelines and clinical best practice information about DVT prevention and management

Clinical practice, formulate standardized DVT prevention process, train medical staff, introduce and standardize the use of bleeding risk and thrombus risk assessment tools, grasp the assessment opportunity, formulate medical practice and patient health education manual, hold regular nurse-patient exchange meetings, explain DVT related knowledge to patients and their families, implement DVT prevention and health education, and incorporate relevant contents into performance appraisal as quality supervisor Check^[11]. After the application of the best evidence, the scores of knowledge related to DVT foundation, evaluation, prevention and treatment, and the implementation rate of evaluation, examination, prevention and education were significantly improved (all $P < 0.01$), which effectively improved the cognitive level of DVT of medical staff and standardized their work behavior.

3.2 The application of the best evidence can improve the quality of clinical care and improve the patient's outcome. The occurrence of DVT after spine surgery is occult. Most patients complicated with DVT have no clinical symptoms and are easy to miss diagnosis. In severe cases, DVT can develop into post-thrombotic syndrome or pulmonary embolism, causing disability and death, and it is a serious complication affecting the quality of life of patients^[12]. Early prevention, detection and treatment are of great significance for the prognosis of patients and ensuring life safety. In this project, the best evidence for prevention and management of DVT was applied to the clinical nursing practice of patients after spine surgery, the thromboembolism prevention and treatment group was established and the prevention and treatment management manual was formulated, the DVT prevention process and related nursing records were continuously improved, and the quality management of thrombosis was guided in a more systematic and standardized manner to make D-dimer. The examination rate, the implementation rate of preoperative, postoperative and discharged health education for patients were all increased to more than 98%, the implementation rate of mechanical prevention was increased from 2% to 92%, the implementation rate of drug prevention was increased from 0 to 38.7%, and finally the incidence of DVT was reduced to 0. It can be seen that the application of the best evidence provides a scientific basis for the prevention and management of DVT for spine orthopedic nurses, and is conducive to improving the outcome of patients and reducing the incidence of DVT in patients^[13].

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