ISSN 2618-1584 Vol. 6, Issue 1: 15-18, DOI: 10.25236/FMSR.2024.060103

A Comparative Study of Adverse Reactions between Pressing and No-pressing after Low Molecular Weight Heparin Injection

Zhang Qiaoyun[1,a], Wang Meng[1,b,*], Nie Yu[1], Zhong Wan[1]

[1]Second Cardiac Ward, The First Hospital of Yulin, Yulin, Shaanxi, 719000, China
[a]859236881@qq.com, [b]3474805809@qq.com
[*]Corresponding author

Abstract: *To compare the degree of bleeding, induration and pain after low molecular weight heparin injection by pressing and non-pressing, so as to provide the basis for clinical nursing. Methods: A total of 97 patients who received subcutaneous injection of LMWH from March to June 2023 were enrolled in this study. Each patient received compression and non-compression methods using self-control method: control side (patient's left abdomen): pressing for 3-5 minutes after injection, experimental side (patient's right abdomen): no compression after injection. The degree of bleeding, induration and pain of the two methods were observed. Results Non-pressing injection is a safe, simple and rapid method, which can meet the needs of clinical nurses, and is worthy of clinical promotion.*

Keywords: *Compression; no compression; subcutaneous injection; percutaneous coronary intervention*

1. Background

Low molecular weight heparin (LMWH) is a new effective anticoagulant drug which is enhanced by the decomposition of ordinary heparin through nitrous acid. It can effectively inhibit the formation of thrombosis and is commonly used in clinical practice. It mainly combines with thrombolytic drugs to treat deep vein thrombosis and arterial thrombosis [1]. Heparin is effective in the prevention of venous thromboembolism and is used in the early treatment of patients with angina pectoris and acute myocardial infarction[2].For patients after percutaneous coronary intervention (PCI) in cardiology department, subcutaneous injection of low molecular weight heparin often combined with intravenous pump of tirofiban, and oral clopidogrel and aspirin at the same time to further strengthen the inhibition of platelet, and achieve ideal clinical therapeutic effect [3]. Studies have shown that subcutaneous hemorrhage at the injection site is closely related to injection methods such as the choice of injection site, injection Angle, injection time, and pressing method after injection [4-6]. In this study, 97 patients who underwent PCI after acute myocardial infarction in the second cardiac ward from March to June 2023 were selected. After injection, two methods were used to observe subcutaneous hemorrhage, induration, and pain, which are reported as follows.

2. Methods

2.1 Trial design

A total of 97 male patients aged 65-75 years old after PCI were selected. All patients were approved by the ethics committee. They were divided into three groups according to the type of low molecular weight heparin injected. Group A: nadroparin calcium (Hebei Changshan), n = 33; group B: dalteparin sodium (Dasachang), n = 34; group C: enoxaparin sodium (Protin), n = 30. There were no significant differences between the three groups, are comparable.

2.2 Patients

2.2.1 Inclusion criteria

Patients that met all of the following inclusion criteria were enrolled: (1)Low molecular weight heparin injection was indicated after PCI; (2)no history of heparin allergy; (3)normal liver and kidney

ISSN 2618-1584 Vol. 6, Issue 1: 15-18, DOI: 10.25236/FMSR.2024.060103

function; (4)no skin damage, scar induration and pigmentation on the abdomen; (5) approved by the ethics committee; (6)Clopidogrel, aspirin and tirofiban were given orally.

2.2.2 Exclusion criteria

Those with any of the following conditions will be excluded from the experiment: (1) hemorrhagic diseases and coagulation disorders; (2)A history of thrombocytopenia with low molecular weight heparin; (3)Severe renal dysfunction; (4)Inability to cooperate with the study due to mental disorders.

2.2.3 Interventions

The abdomen of the three groups was divided into two parts: the right side was treated with no-compression method, and the left side was treated with conventional compression method. (1) Injection site: with the umbilicus as the center, the area of 5 cm up and down, 10 cm left and right, and 5 cm away from the umbilicus was the injection area. Self-designed abdominal injection disk was used to divide the injection area into 14 parts, ensuring that the distance between the center points of each part was not less than 2 cm. (2) Needle cap treatment: pull out the needle cap horizontally and horizontally to reduce the liquid dripping from the needle tip. If there is still dripping, flick the liquid and do not give cotton swab treatment to avoid local subcutaneous tissue damage caused by particle pollution. (3) Injection preparation: without exhaust before injection, the tip of the needle is downward, and the tube wall is flicked to the top of the air. (4) Needle insertion method: after the puncture point was disinfected, the skin folds were pinched up with two fingers to expand the subcutaneous space, and the syringe was held in hand to penetrate the needle vertically at the puncture point, so that the needle was completely penetrated. The specific depth varied according to the thickness of subcutaneous fat of the patient, and the folds were maintained throughout the time, which was easy to be fixed. (5) Injection time: the injection was completed in 10-15 s at a uniform speed and smoothly. After 10 s of pause, the fold was relaxed and the needle was pulled out vertically. 6) Pressing methods: the observation group (right) used the no-pressing method and left immediately after injection, and the control group (left) used cotton swabs to press with the intensity of the skin drop of 0.5cm, and the pressing method was 3-5 minutes.

2.2.4 Outcome assessment

(1) Bleeding evaluation criteria: 0 mm< the maximum diameter of subcutaneous hemorrhage <5 mm was defined as no bleeding; Mild subcutaneous hemorrhage was defined as 5 mm≤ subcutaneous hemorrhage diameter <10 mm; Moderate subcutaneous hemorrhage was defined as 10 mm≤ subcutaneous hemorrhage diameter <20 mm; The maximum diameter of subcutaneous hemorrhage ≥20 mm was defined as severe subcutaneous hemorrhage.

(2) Visual Analog Scale (VAS) was used to evaluate the pain at the injection site 0.5 h after the injection. A 10-cm ruler was used, with a score of 0 representing no pain and increasing pain from 0 to 10.

(3) Induration: Induration was assessed every 12 h after injection and recorded on the injection sheet. If induration occurred, the diameter was measured with a tape measure and recorded in mm.

2.3 Statistical analysis

SPSS22.0 software was used for statistical analysis. VAS pain score, bleeding and induration were expressed as mean standard deviation (x±s). Paired sample t test was used for statistical analysis, and P value < 0.05 was considered statistically significant3.

3. Results

(1) Bleeding: P<0.05, there was significant difference in bleeding between pressing and non-pressing methods,the results are shown in Table 1.

(2) Induration: P>0.05, there was no significant difference in induration between pressing and non-pressing methods. (Table 2).

(3) VAS: P<0.05, there was significant difference in pain between pressing and non-pressing methods. (Table 3).

ISSN 2618-1584 Vol. 6, Issue 1: 15-18, DOI: 10.25236/FMSR.2024.060103

Table 1: The comparison of the effect of bleeding

Group	*A group*	*B group*	*C group*
compression	*2.2±1.0*	*2.1±1.2*	*2.0±1.0*
no-compression	*1.2±0.5*	*0.9±0.5*	*1.1±1.2*
t	*2.81*	*2.91*	*2.48*
P	*0.005*	*0.005*	*0.014*

Table 2: The comparison of the effect of induration

Group	*A group*	*B group*	*C group*
compression	*1.2±0.1*	*1.0±0.1*	*1.1±0.2*
no-compression	*1.3±0.2*	*0.9±0.1*	*1.0±0.2*
t	*-0.11*	*-0.13*	*-0.12*
P	*0.83*	*0.75*	*0.79*

Table 3: The comparison of the effect of VAS score

Group	*A group*	*B group*	*C group*
compression	*2.6±0.5*	*3.0±0.8*	*2.5±0.3*
no-compression	*0.8±0.4*	*1.3±0.4*	*1.0±0.2*
t	*2.71*	*2.82*	*2.35*
P	*0.005*	*0.004*	*0.023*

4. Discussion

Subcutaneous injection of low molecular weight heparin is one of the most common clinical nursing operations in the department of cardiology. During the implementation of the injection operation process, due to the puncture of the capillary by the needle tip and the infiltration of blood into the subcutaneous tissue, bleeding, induration and local pain are prone to occur [7], which can cause psychological tension of patients, affect treatment compliance and reduce patients' trust in nursing staff. It is important to reduce the incidence of adverse reactions such as subcutaneous hemorrhage, induration and pain after LMWH injection. This study shows that the non-pressing method is a safe, simple and rapid method, which can meet the needs of clinical nurses and is worthy of clinical promotion[7]. In terms of subcutaneous hemorrhage, after using the same standard vertical needling method for injection, the risk of subcutaneous hemorrhage with the no-pressing method is lower than that with the conventional 3-5 minutes pressing method. It may be due to excessive pressing after the needle withdrawal operation, which in turn will lead to capillary wall rupture and a certain amount of local blood ecchymosis. Long Yan et al [8] used self-control method to treat 62 patients with navel as the boundary, and believed that no pressing can effectively control and reduce the occurrence of subcutaneous congestion of patients compared with pressing for more than 10 minutes. There is no significant difference in the occurrence of subcutaneous induration between the two pressing methods after injection, which may be related to the rotation of injection sites, the use of disposable pre-irrigation injection and the small needle. Lu Li [9] adopted rotating injection sites, used disposable pre-perfusion injection and used vertical injection method, which did not cause bleeding on the skin surface after pulling out the needle, so there was no need to press, which was consistent with the conclusion of this study, and believed that excessive pressing after pulling out the needle would in turn lead to rupture of the capillary wall, which would develop into a certain amount of local blood ecchymosis and induration. In terms of subcutaneous pain, the pain score of the no-pressing method was lower than that of the conventional method, and the patient's comfort was higher. Zhou Ying [10] et al. found that the non-pressing injection method could effectively reduce the injection pain and the incidence of subcutaneous hemorrhage when giving low molecular weight heparin sodium subcutaneous injection to obstetric patients based on evidence-based nursing. At the same time, the no-pressing method is better than the conventional pressing method in saving the workload of nurses, working time cost, and improving the satisfaction of nurses and patients. It has a positive effect on improving the treatment experience, improving the quality of nursing, and ensuring the safety of medication, which is worthy of application and promotion.

5. Conclusions

Our findings of this current study suggest that press-free injection is a safe, simple and rapid

ISSN 2618-1584 Vol. 6, Issue 1: 15-18, DOI: 10.25236/FMSR.2024.060103

method, which can meet the needs of clinical nurses and is worthy of clinical promotion.

References

[1] Wu Xiaofang, Wang Fen. To evaluate the application effect of quality control circle management in subcutaneous injection of low molecular weight heparin. China's health industry. 2017. 14(18): 75-77.
[2] Hirsh J, Warkentin TE, Shaughnessy SG, et al. Heparin and low-molecular-weight heparin: mechanisms of action, pharmacokinetics, dosing, monitoring, efficacy, and safety. Chest. 2001. 119(1 Suppl): 64S-94S.
[3] Li Xiaolan. Discussion on pressing time of low molecular weight heparin sodium. Medical Information. 2012. 25(2): 303-304.
[4] Zhang Lingxia, Wu Xiaohua. Cause analysis and nursing progress of subcutaneous hemorrhage caused by low molecular weight heparin injection (review). Journal of Anhui Vocational and Technical College of Health. 2014. (5): 88-89.
[5] Wang Yanjiao, Su Jing, Wang Xin. Cause analysis and nursing progress of subcutaneous hemorrhage caused by low molecular weight heparin injection. Chinese Medical Innovation. 2016. 13(26): 135-139.
[6] Ren Ying, Liu Kaili. Cause analysis and preventive measures of subcutaneous hemorrhage caused by low molecular weight heparin injection. Chinese Journal of Practical Medicine. 2016. 11(21): 191-192,193.
[7] Guo Zhilan. Analysis of the relationship between local pressing time and subcutaneous hemorrhage and hemorrhage area after subcutaneous injection of low molecular weight heparin calcium. Chin J Health and Nutrition, 2020. 30(8): 302-303.
[8] Long Yan, Chen Liuyin. Effect of compression after injection of low molecular weight heparin calcium on subcutaneous hemorrhage. Nursing Practice and Research. 2013. 10(9): 41-42.
[9] Lu Li. Improvement and application of subcutaneous injection of low molecular weight heparin. Nursing of Integrated Traditional Chinese and Western Medicine. 2015. 1(2): 99-100.
[10] Zhou Yin. Evidence-based nursing for reducing adverse reactions at subcutaneous injection site of low molecular weight heparin sodium. Chinese and Foreign Med Research. 2020. 18(5): 97-99.