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Research Article

The Effects of Classic Two-Minute Pressing and Commercial Adhesive Bandages on Ecchymosis Development Following Removal of Intravenous Catheters

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Abstract

Introduction: Peripheral intravenous catheter insertion in emergency department has become a routine process. After removing intravenous catheter general approach is to apply pressure with cotton or tampon to entrance area for a few minutes. However, patients are demanding for commercial adhesive bandages instead of applying pressure to the area. The purpose of our study was to investigate the effects of compression and commercial adhesive bandages on development and size of ecchymosis following removal of intravenous catheter in the antecubital region.

Material-Methods: This prospective observational study was conducted in emergency department of a Training and Research Hospital with an average of 300.000 annual admissions. Patients were randomized to receive compression in odd days of the month and commercial adhesive bandages in even days of the month. A total of 221 patients were included in the study. There were 115 patients in the compression group and 106 patients in the commercial adhesive bandage group.

Results: Ecchymosis was found to occur in 22 (22%) patients in compression group and 30 (30%) in bandage group. No statistically significant difference was found between two groups in terms of ecchymosis development ($p = 0.197$). There was no correlation between the diameter of ecchymosis and compression or bandage application ($p = 0.144$). Independent from the application type, ecchymosis was found to occur in 16 (18.7%) male patients and 36 (33.3%) female patients. Significant difference was found between genders in terms of ecchymosis development.

Conclusion: We determined that both applications (compression or commercial adhesive bandage) have similar efficacy in preventing development of ecchymosis. Although local applications can be developed in terms of patient comfort and satisfaction, we suggest that suggestion of one-two minutes of compression following adhesive bandage application might increase patient comfort.

Keywords:

Bandages vs. compression, Ecchymosis, Intravenous catheter, Vascular access

Introduction

Vasculature of humans has been questioned since ancient civilization. More scientific researchers were performed on the

vascular system in the middle ages and vascular access materials evolved since, into steel and glass bottles from hard animal dander and animal bladders. Nowadays, industrial synthetic materials are used as intravenous catheter materials [1].

The administration of drugs that have an important role in providing treatment and care for diseases is one of the basic functions of nursing. It is essential to ensure the patient's safety in preparation and administration of drugs and main objective is to minimize harmful effects of drugs while maximizing the beneficial effects [2]. Therefore, nurses have great responsibility in safely use and administration of drugs. Nurse is responsible for correct administration of the drug, observation of the effects of the drug and thorough evaluation of patients [3,4].

Peripheral intravenous catheter insertion for taking blood samples, intravenous (IV) drug and fluid delivery, and intravenous transfusion of blood products in emergency situations has become a routine process. As intravenous route is the main route for the administration of fluids and drugs in patients with poor health status, it is also the route of administration of majority of drugs used for rapid provision of clinical improvement in outpatient patients with non-life-threatening conditions who make up the major burden of the emergency services. [5,6,7]

After completion of outpatient treatment of patients, intravenous catheters must be removed during discharge. General approach is to apply pressure with cotton or tampon to entrance areafor a few minutes following removal of intravenous catheter. Similarly, the same method is used after a simple blood sampling. However, patients are demanding for commercial adhesive bandages instead of applying pressure to the area. Bandages vs. compression discussions are common in the emergency department between nurses and patients. Development of ecchymosis at intravenous catheter removal area creates physical and mental trauma in patients, causes patients to be reluctant to have next drug injection and limits nurses in choosing the intravenous catheter insertion site due to hematoma and hardness at injection site [8,9]. In the literature, no study was observed investigating the effects of pressure and commercial adhesive bandages on ecchymosis development.

The purpose of this study was to investigate the effects of compression and commercial adhesive bandages on development and size of ecchymosis following removal of intravenous catheter in the antecubital region.

Materials and Methods

This prospective observational study was conducted between February 15, 2013 and March 2, 2014 at emergency department of a Training and Research Hospital with an average of 300.000 annual admissions. Prior to this study, approval was obtained from the ethics committee. Patients over the age of 18 who presented to the emergency department with intended IV fluids and / or drug treatment, and therefore an intravenous catheter to be inserted in the antecubital area were included in the study. The IV catheters were put on for max. 2 hours and were removed for discharged. The catheters were removed by nurses who looked after the patients by gently pulling the catheter from the inserted area. Patients with any known blood disease, anticoagulant and / or anti platelet use and who didn't consent were excluded from the study. Patients were randomized to receive compression in odd days of the month and commercial adhesive bandages in even days of the month.

Patients were given a questionnaire that asked for their age, gender, presence of abnormal pain during the procedure (yes / no) and phone number. Nurses were asked the size of the intravenous catheter, the number of attempts (at the end of how many attempts the catheter could be inserted) and compression / bandage application and answers were recorded. No warning was made to patients with bandage application about compressing over it (Figure 1).

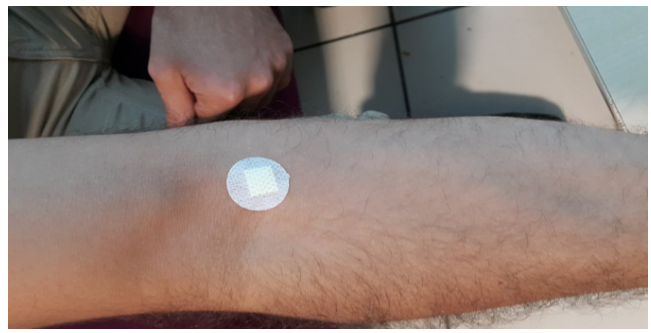

Figure 1: Applying adhesive bandage to IV catheterre moving area.

Compression-applied patients were told to compress for two minutes and allowed to leave the emergency department after this period (Figure 2). During this period, a nurse followed patients whether they apply appropriate pressure.

Figure 2: Applying cotton and press to IV catheterre moving area.

Patients were called by phone after five days and presence of ecchymosis at the injection sites and an estimated diameter were asked (Figure 3). Data of patients were recorded in the SPSS 16.0 program and evaluated.

Results

A total of 221 patients were included in the study. There were 115 patients in the compression group and 106 patients in

Figure 3: Ecchymosis in the IV catheter area after 5 days.

the commercial adhesive bandage group. Patients were called five days after being discharged from the emergency department and 15 patients from compression group and 6 patients from commercial adhesive bandage could not be reached. Compression with cotton was applied to three patients from commercial adhesive bandage group due to unstopped bleeding. But no ecchymosis was seen at the end of five days in these patients. Seventy-two patients were male (36%) and 128 were female (64%). Mean age was 40.3 ± 14 in men and 41 ± 15 in women.

Ecchymosis was found to occur in 22 (22%) patients in compression group and 30 (30%) in bandage group. No statistically significant difference was found between two groups in terms of ecchymosis development (p = 0.197) (Table 1).

	Compression group	Bandage roup
Patient	115	106
Out of study	15	6
Ecchymosis	22	30

Table 1: The results of the study.

There was no correlation between the diameter of ecchymosis and compression or bandage application (p = 0.144). Independent from the application type, ecchymosis was found to occur in 16 (18.7%) male patients and 36 (33.3%) female patients. Significant difference was found between genders in terms of ecchymosis development (Table 2).

	Male	Female
Total patient	72(%36)	128(%72)
Mean age	40.3±14	41±15
Ecchymosis	16(%18.7)	36(%33.3)

Table 2: Gender difference between the groups.

Intravenous access was provided with 18G catheter in 17 patients (8.5%), 20G catheter in 151 patients (75.5%) and 22G catheter in 32 patients. There was no relationship between catheter diameter and ecchymosis development. Sixteen patients who had more than one attempt in the same region were excluded from the study.

Discussion

At the end of this study, no correlation was found between compression with cotton and commercial adhesive bandage application in terms of ecchymosis development or ecchymosis size.

In patients presenting to the emergency department, vascular access is often performed for diagnosis and treatment. Safe and comfortable removal of vascular catheters and preventing complications in this region is one situation that medical staff should pay attention to.

As far as we know, there are no studies in the literature comparing both applications. For the first time in the literature, comparison of commercial adhesive bandage and compression with cotton / gauze in terms of stopping bleeding and ecchymosis development is provided with this study.

Patients and their relatives demand commercial adhesive bandage in daily practice. Health professionals think that bandage application will not prevent subcutaneous bleeding, and therefore would cause ecchymosis and pain, so they think applying compression with cotton or gauze to injection site would be more appropriate. In light of this dilemma, contrary to popular belief, application of injection bandages was not determined to create significant ecchymosis. In our study, adhesive bandages were applied without compression to injection site. After that, patients or relatives applied pressure - of their own volition – with minimum force. The other group applied compression for two minutes under supervision of health professionals.

One of the important results of the study is the relationship between the development of ecchymosis and gender. A higher ecchymosis development was determined in female patients.

The reason for more ecchymosis development in women is possibly related to thinness of subcutaneous tissue and sensitivity of the vessel wall structure. In a way inconsistent with the results of our study, estrogen and progesterone have been reported to have positive support in establishment and maintenance of the vessel wall stiffness and flexibility. As a consequence of decrease of this support in menopause, loss of flexibility in the vessel wall, thickening and susceptibility to atherosclerosis are seen [10,11]. Although no correlation was detected between ages of the patients and ecchymosis development, regarding subcutaneous adipose tissue thinning and fragility of the vessels, more attention should be paid for preventing bleeding after catheter removal in those elderly patients.

Overall the biggest constraint in the bandage application is that patients do not apply compression to injection site. Indeed, bleeding happened in three patients with bandage application but was stopped with compression.

In conclusion, we determined that both applications (compression or commercial adhesive bandage) have similar efficacy in preventing development of ecchymosis. Although local applications can be developed in terms of patient comfort and satisfaction, we suggest that suggestion of one-two minutes

of compression following adhesive bandage application might increase patient comfort.

Competing interests: The authors declare that they have no competing interests.

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