Minimizing short-term complications in patients who have undergone cardiac invasive procedure: a randomized controlled trial involving position change and sandbag

Kardiyak invazif girişim yapılan hastalarda kısa dönem komplikasyonları azaltma: Kum torbası ve pozisyon değişikliğini içeren randomize kontrollü bir çalışma

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ABSTRACT

Objective: The study aimed to evaluate the effects of putting a sandbag on femoral access site after cardiac invasive procedure and changing patients' position in bed on vascular complications rate and the severity of back pain related to the duration of bed rest after procedure.

Methods: This randomized controlled study included 169 patients divided into five different groups assigned randomly. Group 1 patients were applied 4.5 kg sandbag for 30 minutes and Group 2 patients were applied 2.3 kg sandbag for 2 hours on femoral access site after procedure. Group 1 and 2 patients' body positions were changed every hour beginning from the second hour. Group 3 patients received application of 4.5 kg sandbag for 30 minutes and Group 4 patients were applied 2.3 kg sandbag for 2 hours on femoral access site after procedure and these patients' body positions were not changed after catheterization. Group 5 patients remained in supine position without changing position and had no application of a sandbag.

Results: The incidence of vascular complications was not significantly different in the group with application of sandbag when compared with the group without application of sandbag. Back pain was reported more often in the patients whose positions were not changed and whose heads of beds were not raised ($p<0.05$).

Conclusion: Sandbag was not effective in decreasing the incidence of the vascular complications after procedure. To increase the comfort and to decrease the back pain of the patient, the patient's position should be changed and the head of the bed should be raised about 30 or 45 degrees. *(Anadolu Kardiyol Derg 2007; 7: 390-6)*

Key words: Vascular complication, back pain, position change, cardiac invasive procedure, sandbag

ÖZET

Amaç: Araştırma; kardiyak invazif girişim yapılan hastalarda femoral bölgeye kum torbası konulmasının ve pozisyon değişikliğinin vasküler komplikasyonlara olan etkisini ve işlem sonrasında yatak istirahatı ile ilişkili sırt ağrısının şiddetini belirlemek amacıyla yapılmıştır.

Yöntemler: Araştırmaya, rasgele örneklem tekniği ile beş farklı gruba ayrılan 169 hasta alınmıştır. İşlem sonrasında Grup 1'deki hastalara 4.5 kg.lık kum torbası 30 dk, Grup 2'deki hastalara 2.3 kg.lık kum torbası 2 saat konmuş ve işlemden iki saat sonra saatlik olarak pozisyonları değiştirilmiştir. Grup 3'deki hastalara 4.5 kg.lık kum torbası 30 dk ve Grup 4'deki hastalara 2.3 kg.lık kum torbası 2 saat konmuş ve pozisyon değişikliği yapılmamıştır. Grup 5'deki hastalara kum torbası uygulaması, pozisyon değişikliği yapılmamış ve supin pozisyonda yatırılmıştır.

Bulgular: Kum torbası uygulanan ve uygulamayan gruplar arasında vasküler komplikasyonlar açısından fark saptanmamıştır. Sırt ağrısı pozisyon değişikliği yapılmayan ve yatak başının yükseltilmediği hastalarda daha fazla görülmüştür ($p<0.05$).

Sonuç: Kum torbası, işlem sonrası vasküler komplikasyonları azaltmada etkili değildir. Hastanın konforunu artırmak ve sırt ağrısını azaltmak için hastaların pozisyonu değiştirilmeli ve yatak başı 30°-45° yükseltilmelidir. *(Anadolu Kardiyol Derg 2007; 7: 390-6)*

Anahtar kelimeler: Vasküler komplikasyonlar, sırt ağrısı, pozisyon değişikliği, kardiyak invazif girişim, kum torbası

Introduction

Cardiac interventions have become a commonly accepted treatment option for patients with coronary heart disease (1). The majority of procedures are performed via a femoral approach (2). Coronary and peripheral angiography is associated with low but significant risk of the access site complications (3). The patient's outcomes after removing of sheaths include vascular complications, such as bleeding, hematoma, distal embolization, pseudoaneurysm and arterial thrombosis and they are the most important vascular complications of coronary angiography (2, 4).

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Because of the potential vascular complications, all patients had prolonged bed rest with restricted movement after the procedure in order to prevent bleeding from the femoral access site. However, several investigations have shown that patients reported several problems tolerating this immobility, such as discomfort and pain. The back pain is a common problem among patients after coronary angiography and is associated with immobility and restricted positioning. In addition, prolonged bed rest often delays hospital discharge and increases costs (5-8).

Hospitals vary in the nursing policies concerning the length of bed rest after coronary arteriography via the femoral artery approach. The duration of bed rest post-procedure differs according to sheath size and local policy and may vary from 4 to 24 hours (2). However, suggested bed rest duration times vary, ranging from 2 to 6 hours (5). After the procedure of angiography and catheterization, early ambulation and reduction of the time patients remain in supine position and elevation of the head of bed between 30-60 degrees may significantly decrease patient's discomfort and back pain after coronary angiography without increasing vascular complications. In this way, patients would have less discomfort, ambulate, and be discharged home earlier, staff would be deployed more efficiently, and throughput would be enhanced (7, 9-11).

That application of the weight of 2.3 kg- 4.5 kg (5-10 pound, 1 pound=454 gr) on femoral access site helped in reducing the bleeding has been shown in several studies (12, 13). Sandbags have been placed over arteriotomy site (12). On the other hand, the effectiveness of sandbag application in preventing vascular complications has not been demonstrated Christensen et al (12) and Juran et al (13). It was seen that application of a sandbag was unnecessary and there was no increase of vascular complications in the patients who were not applied a sandbag (12, 13).

The aim of this study was to evaluate the effect of putting a sandbag on femoral access site after cardiac invasive procedure by changing patients' position in bed on vascular complications rates and to determine severity of back pain related to bed rest duration after coronary angiography.

Methods

Patients

Totally 340 patients were admitted to the Ege University Medical Faculty Cardiology department for coronary angiography and/or cardiac catheterization between 15.2.2004–15.5.2004. Overall, 169 (158 -undergoing coronary angiography, 11 -undergoing coronary angiography and/or cardiac catheterization) patients were found eligible to participate in this randomized and controlled study. The exclusion criteria of the study were: age below 18 years; non- femoral approach for the procedure; history of treatment with thrombolytics and known bleeding disorder; experienced back pain and deep vein thrombosis before the procedure; systolic pressure >190 mmHg or diastolic pressure >110 mmHg; usage of the arterial sheath larger than 7-F size [7-F=the diameter of catheter (1 French (f)=0.33 mm)]; active bleeding in femoral access site before sheath removal; procedural complications such as hematoma, bleeding, and arrhythmias; unconsciousness; refusal from participation in the study.

All patients were randomly (sealed envelope randomization) assigned into 5 groups in accordance with type of treatment initiated immediately after sheath removal and achieving adequate hemostasis - the application of sandbag of different weight and duration, and position changes:

Group 1 - 35 patients whose positions were changed and a sandbag of 4.5 kg was applied for 30 minutes; Group 2 - 35 patients whose positions were changed and a sandbag of 2.3 kg was applied for two hours; Group 3 - 32 patients whose positions were not changed and a sandbag of 4.5 kg was applied for 30 minutes; Group 4 - 34 patients whose positions were not changed and a sandbag of 2.3 kg was applied for two hours; Group 5 - 33 patients who regularly remain supine position without changing position and who had no application of a sandbag.

Ethical Consideration

Ethical approval for the study was obtained from the Ethics Committee of the Nursing School of Ege University. The researcher explained the study to potential participants, and written informed consent was obtained. Anonymity and confidentiality were assured, and participants were told that they could withdraw from the study at any point without adverse effects on their subsequent care.

Intervention

Femoral arterial sheaths of 7-F size were used and sheaths were removed by an interventional cardiologist after the procedure. After sheath removal, hemostasis on the femoral access site was achieved by manual compression. When satisfactory hemostasis was achieved, sterile gauze sponges that have the dimension of 10x10 cm have been placed as the dressing material on the femoral access site. The access site was covered by sticking cloth plaster of 5 cm width in stripes of 30 cm length over sterile tampons. After the patients were taken into their beds, sandbags of 2.3 kg or 4.5 kg prepared by the researchers were applied to the femoral site. Sandbags were prepared in the dimension of 32 x 12 x 8 cm.

Group 1 patients were applied a sandbag of 4.5 kg for 30 minutes and Group 2 patients received application of a sandbag of 2.3 kg for two hours. Group 1 and 2 patients' positions were changed. Patients were turned to unaffected side at interval to decrease back pain from the second hour when they were taken into their beds and the head of the beds were raised about 30-45 degrees. Patients were repositioned hourly, alternating between supine, right side lying, and left side lying, remaining for 1 hour in each position, during the first 7 hours. During side lying, a pillow was placed at the lumbar area for support and the affected leg remained straight.

Group 3 patients were applied a sandbag of 4.5 kg for 30 minutes and Group 4 patients received application of a sandbag of 2.3 kg for two hours. Group 3 and 4 patients' positions were not changed. These patients received routine care with bed rest until next morning after the procedure and affected leg was immobilized during bed rest. Group 5 patients remained in supine position without changing position and had no application of a sandbag.

All patients were mobilized next morning at 08:00. Five minutes prior to mobilization all patients were assisted to sit on the edge of the bed for five minutes to avoid possibility of postural hypotension. On mobilization, each patient was asked to walk around the ward and then observed. If no vascular complications were encountered patients were allowed to mobilize freely.

Data Collecting Instruments

Demographics and clinic characteristics were obtained by patient reports. The variables were listed in a record form: age, gender, body mass index (BMI), systolic blood pressure before and after the procedure measured at the bed unit, systolic blood pressure at the beginning and end of the procedure measured at the catheterization laboratory and the bed unit, drugs, sheath size, time of compression, time of bed rest, hospital stay time, clinical patient history, previous invasive procedure(s), presence of diabetes mellitus, renal disease, and peripheral arteriosclerosis.

Pre-and postprocedural hemoglobin, hematocrit, prothrombin time (PT) and activated partial thromboplastin time (aPTT) were obtained in all patients. The independent clinical examinations were performed to determine the presence of bleeding, ecchymosis, hematoma and other vascular complications. The bleeding and hematoma in femoral access site were visually checked, when hematoma was recognized, its margin was marked by permanent ink pen and its size was measured by using millimetric measuring paper. Bleeding was described as any ooze, leaking or frank blunt drainage from the puncture site. Insignificant bleeding was defined as blood loss estimated as less than 100 mL. Significant bleeding was defined as blood loss estimated as equal or greater than 100 mL. Minor hematoma was defined as an accumulation of blood at skin level with a diameter of >5 cm in the area of the artery puncture. The subjective assessment of bleeding and hematoma was a routine assessment made by researcher and a doctor. Femoral puncture sites were assessed every 15 minutes for the first hour, then hourly for the following 6 hours. The final assessment was done the morning following the procedure at 08.00 hours.

Patient's vital signs and circulatory status were assessed (every 15 minute in first hour, 30 minutes in second hour, and then every hour during rest of the time). The participants were asked to describe their back pain and rate its severity by using the Visual analogue scale (VAS) (0=none, 10=severe pain) on immediate return the unit, and then after 2nd, 4th, 6th hour and the next morning at 8:00 AM. Visual analogue scale is a 10-cm straight horizontal line anchored at each end with descriptor terms representing the limits of the variable being measured (for pain intensity: no pain/worst pain possible). It has been used in clinical situations for many years and has been reported to be sensitive, valid and reliable (14). All values in the observation form after procedure were measured and filled by the researcher.

Statistical analysis

Data were analyzed using the Statistical Package for Social Science (SPSS, version 10.0, Chicago, IL, USA, 1999). The sample size of the study was calculated with power of 80% and significance level of 5% according with the results of previous study (12). Patient`s demographic data were estimated as number and percentage. Chi-square test was used for analysis of discrete variables, while one-way ANOVA and Student t test were applied for analysis of continuous variables. For the ANOVA analysis, the post hoc comparisons were accomplished using Tukey HSD test. For determining relation among the variables, analysis of correlation was used. The level of significance was set at <0.05 (15).

Results

Patient characteristics for the 169 patients studied are summarized in Table 1. There were no statistically significant differences in gender, age, BMI, history of hypertension, diabetes mellitus, hyperlipidemia, smoking, previous MI and antithrombotics drug utilization among the groups (p>0.05).

Table 1. Patients demographics and baseline characteristics (n=169)

Characteristics	Group 1 (n=35)	Group 2 (n=35)	Group 3 (n=32)	Group 4 (n=34)	Group 5 (n=33)	p*
Age, years (mean±SD) - 56.9±11.5 (range; 18-82)						
≤50, n (%)	13 (37.1)	9 (25.7)	10 (31.3)	9 (26.5)	10 (30.3)	NS
51-70, n (%)	16 (45.7)	20 (57.1)	17 (53.1)	21 (61.8)	22 (66.7)	
≥71, n (%)	6 (17.1)	6 (17.1)	5 (15.6)	4 (11.8)	1 (3.0)	
Sex (Male), n (%)	25 (71.4)	29 (82.9)	17 (53.1)	21 (61.8)	22 (66.7)	NS
BMI, kg/m^2 (mean±SD) - 27.18±3.5 (range; 18-36)						
≤24.9, n (%)	6 (17.19)	8 (22.9)	5 (15.69)	10 (29.4)	7 (21.2)	NS
25-29.9, n (%)	25 (71.4)	18 (51.4)	17 (53.1)	14 (41.2)	18 (54.5)	
≥30, n (%)	4 (11.4)	9 (25.7)	10 (31.3)	10 (29.4)	8 (24.2)	
Hypertension (+), n (%)	19 (54.3)	19 (54.3)	19 (59.4)	20 (58.8)	20 (60.6)	NS
Diabetes Mellitus (+), n (%)	5 (14.3)	8 (22.9)	9 (28.1)	8 (23.5)	8 (24.2)	NS
Hyperlipidemia (+), n (%)	24 (68.6)	23 (65.7)	23 (71.9)	23 (67.6)	27 (81.8)	NS
Smoking (+), n (%)	12 (34.3)	12 (34.3)	12 (37.5)	13 (38.2)	12 (36.4)	NS
Previous MI (+), n (%)	15 (42.9)	14 (40.0)	15 (46.9)	11 (32.4)	12 (36.4)	NS
Antithrombotics (+), * n (%)	25 (71.4)	28 (80.0)	26 (81.3)	28 (82.4)	28 (84.8)	NS

*Chi-square test

BMI-body mass index, MI- myocardial infarction, NS- nonsignificant

* Antithrombotics (Clopidogrel 75 mg, ASA 100 mg or 300 mg and other antithrombotics)

Complications of femoral access site according to application of sandbag

No patient developed major hematoma in this study. In patients whose sandbag of 2.3 kg or 4.5 kg were applied for 30 minutes or two hours, active bleeding in 1 patient (0.7 %), minor hematoma in 12 patients (8.8 %), ecchymosis in 29 patients (21.3 %) and distal embolization in 1 patient (0.7 %) were observed. No statistical difference was found for complications between the groups ($p>0.05$) (Table 2).

Complications of femoral access site according to position changes

In patients whose positions were changed the following complications were observed: active bleeding in 1 patient (1.4 %), minor hematoma in 4 patients (5.7 %), ecchymosis in 11 patients (15.7 %) and distal embolization in 1 patient (1.4 %). There was no difference for complications between the groups ($p>0.05$) (Table 3).

Visual Analogue Scale

The mean VAS values of patient were determined minimum at following time the procedure (0 h). It was detected as the highest next morning after the procedure. Table 4 shows that back pain increased with bed rest time during the first 6 hours after the procedure. Patients who were allowed to change position during the bed rest period (Group 1 and 2) experienced less back pain than patients who remained supine position (Group 3, 4, and 5) during the bed rest.

Back pain levels were statistically significantly different among the groups as five-time period ($p<0.05$). The VAS scores of patients who had the application of same period and same weight of sandbag but who didn't change their positions were different than in the patients who changed their positions ($p<0.05$). Back pain in patients whose positions were not changed was observed to be more severe than in the patients whose positions were changed ($p<0.05$). No statistical difference was determined between the patients whose sandbag was applied but position was not changed (Group 3 and 4) and the patients who had no application of sandbag and remain in supine position (Group 5).

Discussion

The most common complication after percutaneous coronary intervention via the femoral artery is development of vascular complication and any reduction in their rate will be of benefit to patients. In our study, patients who received application of sandbag of 2.3 kg or 4.5 kg for 30 minutes or two hours, active bleeding rate was - 0.7%, minor hematoma rate - 8.8%, ecchymosis rate - 21.3% and distal embolization rate - 0.7%. Patients whose positions were changed active bleeding was seen in 1.4% of cases, minor hematoma - 5.7% of cases, ecchymosis - 15.7% of patients and distal embolization - 1.4% of cases.

In the retrospective defining study by McCabe et al (11), carried out in 306 patients, who underwent coronary angiography with use of 6-F and 7-F catheters, and application of a new care model with 3-4 hours of bed rest and raising the head of bed 30 degree without putting sandbag on the femoral access site; vascular complications developed in 11.4% of patients (11). Arterial thrombosis was observed in 10.9% of patients in the study of Franco et al. (16). Peripheral artery embolization happened in 2.7% of 144 patients who were included in the descriptive angiography study of Balduf et al (17).

In previous studies comparing the application of pressure bandage and adhesive bandage, it has been observed that bleeding rate was higher in patients who did not receive application of pressured bandage and at the same time use of pressured bandage increased back pain, leg pain, groin pain and vomiting and urine retention, which limited their routine use (10, 18-20).

The mechanical and manual compressions in providing hemostasis at the femoral access site after coronary angiography were compared in several studies. It has been seen that less bleeding and ecchymosis occurred in the patients who were applied manual pressure (1, 21). Several investigators have pointed out that use of haemostatic closure device for providing hemostasis after coronary angiography shortens the period of

Table 2. Complications of femoral access site according with application of sandbag (n=169)

Complications	Sandbag (+) (Groups 1,2,3,4) (n=136)	Sandbag (-) (Group 5) (n=33)	p*
Active bleeding, n (%)	1 (0.7)	0 (0)	NS
Minor hematoma, n (%)	12 (8.8)	2 (6.1)	NS
Ecchymosis, n (%)	29 (21.3)	4 (12.1)	NS
Distal embolization, n (%)	1 (0.7)	0 (0)	NS

*Chi-square test
NS- nonsignificant

Table 3. Complications of femoral access site according with changing position (n=169)

Complications	Position change (+) (Groups 1 and 2) (n=70)	Position change (-) (Groups 3, 4, 5) (n=99)	p*
Active bleeding, n (%)	1 (1.4)	0 (0)	NS
Minor hematoma, n (%)	4 (5.7)	10 (10.1)	NS
Ecchymosis, n (%)	11 (15.7)	22 (22.2)	NS
Distal embolization, n (%)	1 (1.4)	0 (0)	NS

*Chi-square test
NS- nonsignificant

hemostasis and hospital stay duration, and increases the patient's comfort (5, 22). However, we did not use haemostatic closure device after sheath removal, hemostasis on the femoral access site was achieved by manual compression in this study.

Amman et al. stated that obese patients are more prone to vascular complications. Although no relation was identified between BMI and vascular complications in their study, more vascular complications had been observed in obese patients (23). In our study, we exclude the possible effects of obesity on vascular complications rate, because all patients groups were comparable by BMI.

Some studies reported that the sandbag was not effective in reducing vascular complications and bleeding incidence (12, 13). The sandbag increased the discomfort of patients and it was less tolerated by patients. They suggested the bed rest duration, hospital stay time and healthcare costs were decreased, however the patient discomfort increased (12, 13). In our study, patients with a sandbag had an increased back pain and discomfort. Furthermore, sandbag did not reduce vascular complications rate.

Several studies stated that mobilization after catheterization procedure should be done between 2-6 hours (2, 6, 9). Other studies showed that along with decreasing the period of bed rest after cardiac catheterization the cost reduced, back pain of patient lessened, the time spent for care and the duration hospital stay shortened (24, 25). The radial approach provided an early mobilization; it increased the patient's comfort and reduced the cost (26). In our study procedures were performed via a femoral approach. Our patients were not mobilized early because of the institutional policy.

The manual compression was applied to the femoral access site for providing hemostasis after sheath removal in our study. The period of hemostasis was reported to be longer in patients who were applied manual pressure (27). When this study is compared with other studies in the literature, it was seen that patients had long-term bed rest (18.69±1.5 hours) and that they were discharged from hospital later (1.31±0.5 days). We assume that the differences between the studies depend on the policy followed by the institution.

Table 4. Comparison of VAS scores between groups (N=169)

Score	Groups	n	Mean±SD	F*	p*	p1-3,4,5**	p2-3,4,5**
VAS 0	Group 1	35	0.11±0.40	2.681	0.03	NS	NS
	Group 2	35	0.00±0.00				
	Group 3	32	0.00±0.00				
	Group 4	34	0.00±0.00				
	Group 5	33	0.00±0.00				
VAS 2	Group 1	35	1.80±0.86	49.138	0.0001	0.0001	0.0001
	Group 2	35	1.74±0.74				
	Group 3	32	3.81±1.06				
	Group 4	34	4.29±0.97				
	Group 5	33	3.42±1.22				
VAS 4	Group 1	35	2.57±0.85	83.501	0.0001	0.0001	0.0001
	Group 2	35	2.57±0.85				
	Group 3	32	5.88±1.31				
	Group 4	34	6.29±1.19				
	Group 5	33	5.52±1.56				
VAS 6	Group 1	35	2.89±1.05	134.319	0.0001	0.0001	0.0001
	Group 2	35	2.91±0.85				
	Group 3	32	7.28±1.32				
	Group 4	34	7.38±1.15				
	Group 5	33	6.79±1.45				
VAS 08	Group 1	35	3.03±1.22	154.352	0.0001	0.0001	0.0001
	Group 2	35	3.03±1.17				
	Group 3	32	8.38±1.21				
	Group 4	34	8.21±1.51				
	Group 5	33	7.97±1.48				

*- one-way ANOVA

** - post hoc Tukey HSD test differences between groups 1 and 3,4,5; group 2 and 3,4,5; differences between groups 1 and 2, throughout all scores are insignificant; pairwise differences between groups 3, 4 and 5 throughout all scores are insignificant

NS- nonsignificant, VAS - visual analogue scale

Previous studies (7, 28) reported that changing the position of patients might reduce back pain without increasing vascular complications and increase their physical comfort. As a result, the time spent for care and the duration of the administration of analgesics and back rubs to the patient decreased (7, 28).

Chair et al. (7) noticed the back pain as a significant problem after coronary interventions, primarily among patients from Western populations, with reported mean back pain/discomfort scores that ranged from 3.829 to 7.045 (0=none, 10=severe pain discomfort) for the first 6 hours after the procedure. In their study, it was found that Chinese people have less mean back pain/discomfort scores (range 0.18-2.23) than Western populations (8). In our study, mean back pain scores ranged from 0.00 to 8.38 after procedure. The markedly improved back pain in the morning following coronary intervention for five groups is likely to be due to prolonged immobilization. During the night, the highest back pain score was reported at 08:00 a.m. following procedure. These suggest that perception of intensity of pain may vary among cultures. The back pain scores were similar to that of reported for Western population.

Back pain levels of patients statistically significantly differed among the groups in our study ($p<0.05$). The VAS values of patients whose positions were not changed after the process in groups 3, 4, and 5 were higher than the VAS values of patients in groups 1 and 2. Back pain of patients that did not move and remained in supine position was found to be higher than patients of other groups. Back pain was evaluated at 0, 2nd, 4th, 6th and the next morning at 08:00 after the procedure and the minimum back pain levels were determined immediately after the procedure (0 h) due to remaining of patients in the same position for a short time. In several studies, back pain level at 6th hour was assessed to be higher than during other periods after the procedure (7, 8). Evaluating back pain level at 6th hour after the coronary angiography/cardiac catheterization was consistent among all our patients and these findings are in accordance with previous reports. Prolonged bed rest is thought to cause back muscle weakness and fatigue, due to pressure exerted continuously to the same muscles, while muscle fatigue is thought to cause back muscle spasms and back pain.

Alternating position in bed from lying flat to sitting and then walking is generally associated with a reduction in stress on the back muscles, while the gradual increase in movement promotes flexibility and reduces back strain. In addition, prolonged bed rest may contribute to muscle weakness and fatigue, leading to greater level of back pain after coronary angiography/cardiac catheterization. Therefore, early ambulation following procedure may be an additional strategy that nurses use to promote patient comfort after these procedures (8). In this study, back pain scores of patients whose positions were not changed and who remained in the supine position were higher than in those of patients whose positions were changed and the heads of bed were raised ($p<0.05$). It is concordant with the literature that lying in supine position without moving increased back pain (8).

Conclusion and implications

In conclusion, our study shows that the incidence of severe vascular complications in our patients does not exceed currently published rates. The study indicates that, sandbag was not effective in decreasing the incidence of the vascular complications such as bleeding and hematoma after the diagnostic invasive procedures. Patients with a sandbag had an increased back pain. The study's findings suggest that sandbag could not be recommended. Patients might safely change their positions in bed earlier, the head of bed should be raised about 30-45 degrees and the duration of bed rest should be shortened after the procedure. Changing position in bed may also, reduce back pain and promote physical comfort and reduce patients' negative feelings toward coronary angiography. In addition to pain medication, other comfort measures such as back rubs may be required more frequently among patients following procedure to reduce back pain. When back pain of patient is lessened, the workload of health care workers could be reduced and consuming more analgesic of patient could be prevented. The early mobilization may lead to earlier discharge; additional costs can be moderated by providing the usage of patients' beds more effectively. Results obtained in this study provide nurses with a better understanding of patients' physical needs, so that appropriate nursing interventions can be planned to enhance patient comfort after cardiac intervention. Furthermore, the findings obtained provide nurses with the evidence for collaborating with physicians and healthcare providers, to modify existing post-coronary intervention protocols, to encourage early ambulation, and to enhance patient comfort. True collaboration involves equally valued contributions by different members of the health care team. This innovative nursing research project contributes to evidence-based nursing interventions, aimed at improving post procedures care in Turkey through protocol modification by collaboration with other health care team members.

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