

# The Effect of Post Coronary Angiography Bed-Rest Time on Vascular Complications

Rabiallah Farmanbar, MSc<sup>1</sup>, Madjid Chinikar, MD<sup>2</sup>, Maryam Gozalian, MSc<sup>3\*</sup>, Mojgan Baghaie, MSc<sup>1</sup>, Zahra Atrkar Roshan, MSc<sup>2</sup>, Mohamadtaghi Moghadamnia, MSc<sup>1</sup>

<sup>1</sup>College of Nursing and Midwifery, Guilan University of Medical Sciences, Rasht, Iran.

<sup>2</sup>Cardiology Department, Guilan University of Medical Sciences, Rasht, Iran.

<sup>3</sup>Valiasr Teaching Hospital, Zanjan University of Medical Sciences, Zanjan, Iran.

Received 12 August 2008; Accepted 26 October 2008

## Abstract

**Background:** Coronary angiography is frequently applied for diagnostic purposes in patients with coronary artery disease. Be that as it may, there is still no consensus about the optimal time for the ambulation of patients following femoral arterial puncture. We sought to compare 6 hours of complete bed rest and 2 hours of complete bed rest in patients after angiography.

**Methods:** This randomized quasi-experimental study was performed in 120 patients candidated for coronary angiography. The patients were divided into experimental and control groups randomly. Primarily demographic data were obtained from both groups before intervention was carried out for them. The arterial sheath was removed immediately after the procedure. Hemostasis was achieved by manual compression and maintained with sandbags. Early ambulation was attempted after two hours of supine bed rest following sheath removal. The incidence of bleeding and insertion site complications was documented at 24 hours and subsequently at 30 days post-procedure.

**Results:** Our findings were indicative of no significant difference between the two groups in terms of gender, age, body mass index, catheter size, total procedure duration, total hemostasis time, history of anticoagulant drug use, and coagulation tests before angiography. Pre-ambulation bleeding occurred in 2 patients in each of the two groups. Post-ambulation bleeding occurred in 2 patients in the control group and 1 in the experimental group. Whereas there was no incidence of large pre-ambulation hematoma in the control group, there was one case in the experimental group. There was no case of post-ambulation hematoma, however, in either group, and nor was there any late bleeding or vascular complication.

**Conclusion:** Ambulation 2 hours after angiography via the femoral site is feasible and safe with the same incidence of insertion site complication as that of 6 hours of bed rest. Therefore, an early ambulation protocol can shorten hospital stay without significant vascular complications.

*J Teh Univ Heart Ctr* 4(2008) 225-228

**Keywords:** Coronary angiography • Early ambulation • Bed rest

## Introduction

Coronary artery disease is one of the leading causes of death in the world.<sup>1,2</sup> Coronary angiography is a routine diagnostic procedure indicated for the assessment and evaluation of cardiac diseases such as coronary artery

disease and valvular disease.<sup>2</sup>

Nowadays, a femoral coronary artery catheter is commonly used for this invasive procedure. It is, however, associated with a risk of such complications as bleeding and hematoma at the femoral arterial puncture site.<sup>3</sup> The potential of these complications has been traditionally reduced

\*Corresponding Author: Maryam Gozalian, Zanjan University of Medical Sciences, Valiasr Teaching Hospital, End of Sheikhfazlloahenoori Highway, Zanjan, Iran. Tel: +98 241 7123299. Fax: +98 241 7270751. Email: Gozaleyan@yahoo.com.

by restricting the patient to at least 6 hours of bed rest after angiography.<sup>1</sup> This practice is based on empirical reasoning and tradition and is associated with discomfort for the patient.<sup>4</sup>

Several studies support reducing the duration of bed rest to 2 or 3 hours for the outpatients who have diagnostic coronary angiography.<sup>4-7</sup> There were no studies in the existing literature to examine bed-rest times following any cardiac catheterization in Iran when this trial was designed.

The purpose of the current trial was to test the hypothesis that reducing time-to-ambulation from 6 hours to 2 hours would not increase post-angiography vascular complications.

## Methods

The study was conducted from November 2006 to February 2006 in the post-angiography wards of two hospitals in Rasht (Heshmat Teaching Hospital and Arya Hospital). All the patients of one interventionist (to control the complications related to the operator's experience) presenting for cardiac angiography to the hospitals were considered for study participation if a femoral arterial approach was planned. The study protocol was approved by the Ethics Committee of Guilan University of Medical Sciences, and written informed consent was obtained from all the patients. Single puncture of the femoral artery was an inclusion criterion; and renal failure, chronic obstructive pulmonary disease, known pre-procedure bleeding disorder, and patient transfer to the ICU after angiography comprised the exclusion criteria.

The patients were randomized to a period of either 2 hours (experimental group) or 6 hours (control group) of bed rest after sheath removal. Upon the completion of angiography, the patients were transferred to the post-angiography ward, where the arterial sheaths were removed immediately by experienced nurses and hemostasis was achieved by the manual compression of the puncture site. The minimal time of compression was 10 minutes. A transparent dressing was applied on the puncture site in order to control bleeding and hematoma and to augment the visibility of the puncture site. Two sandbags (each weighing 2.5 kg) were used to remind the patient not to move the affected leg during the supine position of bed rest. One of the sandbags was removed after one hour of bed rest, and the second was lifted before ambulation.

The patients' vital signs, pedal pulses, and puncture site were checked prior to sheath removal, every 15 minutes after hemostasis for 1 hour, every 30 minutes for 1 hour, and thereafter every 1 hour until ambulation. After ambulation, they were checked every 15 minutes for 1 hour. The final assessment for the presence of any complication was made at discharge, i.e. the day after angiography.

Bleeding was defined as any bleeding that required renewed compression. Hematoma formation was defined

as small (a palpable mass <5×5 cm) and large (a palpable mass >5×5 cm), and late complications were determined by the ultrasound appearance of false aneurysms or fistulas.

These complications were checked for 24 hours on patient follow-up by one nurse. At 30 days, the patients were visited by their physicians and were checked for late complications via ultrasound.

The data were analyzed using the Statistical Package for Social Sciences (SPSS, version 13). The Chi square, t-test, and Fisher Exact test were employed to determine any significant differences between the two groups.

## Results

During the study period, 120 patients, who had met the inclusion criteria, were randomized to two groups of 2 hours (n=60) and 6 hours (n=60) of bed rest.

There were no statistically significant differences in terms of gender, age, body mass index, catheter size, total procedure duration, total hemostasis time, history of anticoagulant drug use, and coagulation tests between the two groups pre-angiography. The results are summarized in Table 1. Table 2 depicts the incidence of vascular complications.

Table 1. Patient characteristics

	experimental(n=60)	control(n=60)	P value
Age (y)	60.17±11.50	59.9±10.15	0.51
Male	61.7 %	58.3 %	0.70
BMI (kg/m <sup>2</sup> )	27.08±4.11	28.04±4.29	0.25
PT (sec)	12.63±0.54	12.73±0.49	0.31
PT activity (%)	98.64±4.26	99.27±2.22	0.30
INR	1.01±0.04	1.08±0.02	0.40
PTT (sec)	31.9 ±3.17	31.43±3.04	0.41
Platelet count	210433±69498	221066±62870	0.38
Procedural time (min)	15.63±4.43	15.45±4.64	0.54
Time to hemostasis (min)	17.6±3.25	17.85±3.16	0.93
7 French sheath usage	96.7 %	93.3 %	0.40
Use of oral antiplatelet	90%	91.6%	0.91

BMI, Body mass index; PT, Prothrombin time; PTT, Partial thromboplastin time

Table 2. Vascular complications

Variable	Experimental (2 hours)	Control (6 hours)	P value
Bleeding before ambulation	2 (3.3%)	2 (3.3%)	0.69
Small hematoma before ambulation	1 (1.7%)	1 (1.7%)	0.75
Large hematoma before ambulation	1 (1.7%)	0	0.50
Post-ambulation bleeding (until 24 hours)	1 (1.7%)	2 (3.3%)	0.50
Post-ambulation hematoma (until 24 hours)	0	0	-
Late vascular complication (after 30 days)	0	0	-



Pre-ambulation bleeding occurred in 2 (3.3%) patients in both groups. In addition, post-ambulation bleeding occurred in 1 (1.7%) patient in the experimental group and 2 (3.3%) patients in the control group.

Small pre-ambulation hematoma (a palpable mass < 5×5 cm) occurred in 1 (1.7%) patient in both groups, while large pre-ambulation hematoma (a palpable mass > 5×5 cm) was observed in 1 (1.7%) patient in the experimental group. There were no hematomas (small or large) after ambulation in either group. Also, there was no late bleeding or vascular complications such as a false aneurysm or arteriovenous fistula at 30 days' follow-up.

The incidence of vascular complications before and after ambulation did not differ significantly between the experimental and control groups (Fisher Exact test=not significant).

## Discussion

The results of the present study, the first report of early post-angiography ambulation in Iran, show that early ambulation (two hours) after coronary angiography is safe and not associated with an increased risk of vascular complications compared to 6 hours of bed rest. Our results chime in with those of many previously published studies by investigators such as Alarcán et al.,<sup>8</sup> Wangs et al.,<sup>9</sup> Tagney, Lackie,<sup>10</sup> and Tengiz et al.,<sup>11</sup> demonstrating the safety of early ambulation after diagnostic and therapeutic cardiac catheterizations.

Rosenstein et al.<sup>5</sup> found similar complication rates after 6 French diagnostic heart catheterizations among patients who commenced ambulation 2 hours after sheath removal compared to those who did so 6 hours after the removal of the sheath. Koch et al.<sup>4</sup> demonstrated the safety of early ambulation in patients who underwent percutaneous coronary angioplasty with 6 French sheaths and low-dose heparin. Gianakos et al.<sup>12</sup> in a pilot study also showed that 2 hours of bed rest by comparison with 4 hours of bed rest after electrophysiological procedures could be safe. They showed that the incidence of bleeding did not differ significantly between the two groups. Vlastic et al.<sup>13</sup> reported that the patients undergoing femoral arterial puncture for coronary interventional procedures could safely ambulate 2 hours after the hemostasis of the puncture site.

## Conclusion

In light of the findings of the present study, we would posit that the institutional standard of requiring 6 hours of bed rest after coronary angiography via the femoral artery could be reduced to 2 hours safely. The reduction of time-to-ambulation may add to the patient's comfort, although it is primarily pursued for economic and logistic reasons in many

centers confronted with increasing numbers of patients and restricted hospital facilities.

## Acknowledgments

This study was approved by Guilan University of Medical Sciences and the Ethics Committee thereof. We hereby wish to express our gratitude for their invaluable support.

## References

- 1- Dressler D. Management of patients with coronary vascular disorders. In: Smeltzer SC, Bare BG, Hinkle JL, Cheever KH, eds. Brunner and Suddarth's textbook of medical surgical nursing. 11th ed. Philadelphia: Lippincott Williams and Wilkins; 2007. p. 858-913.
- 2- Popma JJ. Coronary angiography and intravascular ultrasound imaging. In: Zipes DP, Libby P, Bonow RO, Braunwald E, eds. Braunwald's heart disease: a textbook of cardiovascular medicine. 7th ed. Philadelphia: Elsevier; 2005. p. 423-455.
- 3- Parkosewich JA. Assessment of cardiovascular function. In: Smeltzer SC, Bare BG, Hinkle JL, Cheever KH, eds. Brunner and Suddarth's textbook of medical surgical nursing. 11th ed. Philadelphia: Lippincott Williams and Wilkins; 2007. p. 780-821.
- 4- Koch KT, Piek JJ, Winter RJde, Mulder K, Schotborgh CE, Tijssen JGP, Lie KI. Two hour ambulation after coronary angioplasty and stenting with 6F guiding catheters and low dose heparin. *Heart* 1999;81:53-56.
- 5- Rosenstein G, Cafri C, Weinstein JM, Yroslavtsev S, Abufal A, Ilia R, Fuchs S. Simple clinical risk stratification and the safety of ambulation two hour after 6 french diagnostic heart catheterization. *J Invasive Cardiology* 2004;16:126-128.
- 6- Pamela J, Lisa A, Christine M, Amy L. Evaluation of nursing care after diagnostic coronary angiography. *Am J Crit Care* 2001;10:330-340.
- 7- Pollard SD, Munks K, Wales C, Crossman DC, Cumberland DC, Oakley GDG, Gunn J. Position and mobilisation post-angiography study (PAMPAS): a comparison of 4.5 hours and 2.5 hours bed-rest. *Heart* 2003;89:447-448.
- 8- Alarcán EZ, Cecena F, Ashar R, Patel R, Poppel SV, Carlson R. Safety of elective -including "high risk"-percutaneous coronary interventions without on-site cardiac surgery. *Am Heart J* 2004;148:676-683.
- 9- Wangs SL, Redeker NS, Moreyra AE, Diamond MR. Comparison of comfort and local complications after cardiac catheterization. *Clin Nurs Res* 2001;10:29-39.
- 10- Tagney J, lackie D. Bed-rest post femoral arterial sheath removal-What is safe practice? A clinical audit. *Nurs Crit Care* 2005;10:167-173.
- 11- Tengiz I, Ercan E, Bozdemir H, Durmaz O, Gurgun C, Nalbantgil I. Six hour ambulation after elective coronary angioplasty and stenting with 7F guiding catheters and low dose heparin. *Kardiol Pol* 2003;58:93-97.
- 12- Giannakos S, Keeling AW, Haines D, Haugh K. Time in bed after electrophysiological procedures (TIBS IV): a pilot study. *Am J Crit Care* 2004;13:56-58.
- 13- Vlastic W, Almond D, Massel D. Reducing bed rest following arterial puncture for coronary interventional procedures-impact on vascular complication: The BACTrial. *J Invasive Cardiol* 2001;13:788-792.

