

RISK OF HEMATOMA AFTER FEMORAL ARTERY PUNCTURES IN PATIENTS UNDERGOING DIAGNOSTIC OR INTERVENTIONAL ANGIOGRAPHY

Amin Rajani, Raza Sayani, Rana Shoaib, Zahid Anwar, Mohammad Asif Bilal, Muhammad Ali

Department of Radiology, Aga Khan University Hospital, Karachi, Pakistan.

PJR January - March 2011; 21(1): 40-42

Introduction

Local hematoma formation and bleeding have long been recognized and accepted as a frequent complication following trans-femoral puncture.^{1,2} The risks of invasive diagnostic techniques are placed under greater scrutiny today with the development and improvement of non invasive techniques such as CT angiography and MR angiography.³ Since the introduction of digital subtraction angiography to routine clinical practice, various studies have been performed to determine complications and their frequency related to this procedure.^{4,5} Furthermore, many interventional procedures are being conducted on an outpatient basis, reflecting limited inpatient bed availability.

Objective

The purpose of this study is to assess the incidence of hematoma after femoral artery puncture in patients undergoing diagnostic or interventional angiography.

Materials and Methods

Data were collected for over a period of 4 months from January 1st 2011 to April 30th 2011 at a tertiary care academic hospital. All patients undergoing diagnostic or interventional angiography via femoral route were included in this study. Patients were referred for angiography by clinicians (vascular surgeons, neurosurgeons, gastroenterologist and chest physicians).

Correspondence : Mr. Amin Rajani
Department of Radiology,
Aga Khan University Hospital,
Stadium Road, P.O. Box 3500, Karachi 74800
Pakistan. Tel. No: 34930051 - Ext. 2020
E-mail: rajani.amin@aku.edu

Patients who were disoriented and unable to follow the instructions or in whom arterial closure devices were used were excluded from the study. Predisposing conditions like poorly controlled diabetes, uncontrolled hypertension, significant renal insufficiency, CLD, uremia and irreversible coagulopathy were also considered during evaluation.

The referred patients were either admitted or procedure performed as outpatient. They were assessed by radiology fellow or consultant to confirm that they were suitable to proceed with angiography. This assessment included checking for any recent clinical deterioration, a routine check of vital signs, and ensuring that no renal insufficiency or any other coagulopathy related disorders which was corrected when possible. Informed consent was obtained by the radiologist in the angiography suite. Procedures were performed on Siemens Axiom Artis with road mapping capabilities. The procedures were performed by interventional radiologists with experience ranging from 3 to 20 years. Fellows and residents in interventional radiology also performed some of the procedures under the direct supervision of a radiologist.

Lignocaine 2% local anesthetic was used at the intended puncture site (predominately the groin). In general, 4-French catheters were used for diagnostic studies, and 6-8 French catheters for therapeutic neurointervention. 5 to 8 French sheaths were used for the procedures. If interventions like angioplasty, stent insertion or neurointervention was performed, heparin was given intra-arterially at doses of 2,500–5,000 U per patient. The standard Seldinger technique was used to introduce the catheter over a guidewire. ECG,

blood pressure, and pulseoximetry monitoring were routinely performed by nursing staff. Neurointervention procedures were carried out under general anesthesia. Once the procedure was complete, the puncture site was closed using digital compression by the radiologist, interventional fellow, or resident who performed the procedure. Patients were kept supine and were observed half hourly by nursing or medical staff for blood pressure, pulse, groin puncture inspection, peripheral vascular state, and neurologic state if a cerebral study had been performed. Patients were observed for at least 6 hr after angiography in case of outpatient before discharge. Admitted patients were followed in the ward.

Data were summarized based on procedure type into four main categories: aortofemoral studies, cerebral studies, interventional procedures (e.g., angioplasty, stenting, embolization), and other procedures (e.g., renal study, mesenteric or abdominal aortography, arch aortography, subclavian venography).

At the end of the study period, medical records were reviewed for further details regarding complications that necessitated admission for observation or treatment.

Results

Eighty two patients were evaluated in this audit including 57 males and 25 females. Age ranged from 9 to 80 years. In 68 cases, 5 FR sheath was used for the procedure and in 11 cases 6FR sheath was used. 7 and 8 FR sheaths were used in 2 and 1 patients respectively. (Fig.1) Sheath removal and puncture site compression was given by senior faculty in 7 patients, by VIR fellow in 51 patients, by residents in 14 patients

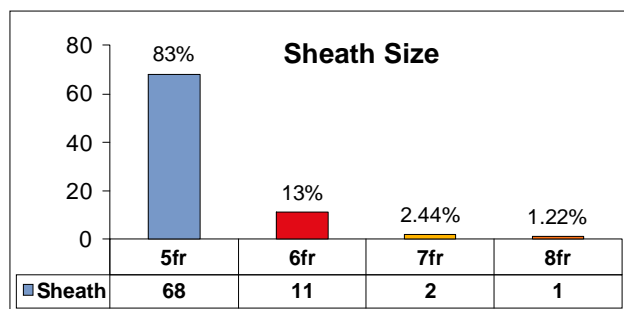


Figure 1: Distribution of usage of different sheath sizes.

and by trained nurses in 10 cases. (Fig.2) Arterial puncture site hematoma was found in one patient in which 5 FR sheath was used in which compression was given by a resident. The other predisposing factors like CLD, uremia, coagulopathy and hypertension were not related to hematoma formation.

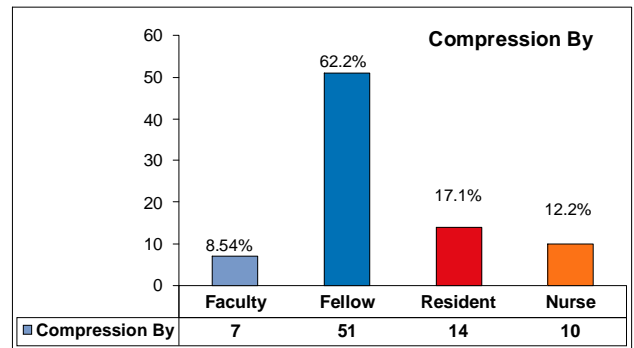


Figure 2: Distribution of different staff performing compression.

Discussion

Hematoma, defined as a lump at the puncture site due to accumulation of blood at skin level with a diameter of > 5 cm in the area of the artery puncture site. It is reported to occur in 10–50% of diagnostic angiograms.^{6,7,8} On observation of hematoma the site is marked by drawing a circle with pen and observed at various intervals to see if the size of hematoma increases. A hematoma was always assessed by two experienced nurses or a nurse and a doctor. This audit indicates that our current activities for angiography and interventional procedures have a low incidence of hematoma formation, falling well within recommended safe practice guidelines. Out of total 82 patients, only 1 had hematoma which was self-limiting and did not require any further management. As expected, the rate of this complication was greater in the interventional procedures that used larger (5-French) catheters. Furthermore heparin use has been seen to increase the risk of bleeding. Other factor identified in our series for hematoma formation was the seniority level of person who was providing manual compression. However due to a very low incidence this is not reliable. Factors like CLD, uremia, coagulopathy, hypertension and size of the catheters or vascular access sheaths were found not to increase the incidence of puncture site hematoma formation.

Current activities for outpatient angiography and interventional procedures have shown a low incidence of major complications, falling well within recommended safe practice guidelines. A significant reduction was seen in the overall rate of complications during the study period as a result of improvements in patient care and technology developments.

Conclusion

We observed a very low incidence (1.21%) of arterial puncture site hematoma in patients undergoing diagnostic or interventional angioplasty. The frequency is far less compared to the published data and practice standards guidelines.

References

1. MK Wong, H Ng, L S Ng and K P Tan. Early 4-hour post-angiography ambulation as a feasible Alternative to routine 24 hour bedrest. *Sing Med J* 1988; **29**: 63-65
2. D.B. Bogart, M.A. Bogart, J.T. Miller, M.W. Farrar, W.K. Barr and M.A. Montgomery, Femoral artery catheterization complications: a study of 503 consecutive patients. *Catheter Cardiovasc Diagn*, 34(1995), pp.8-13.
3. Denis JG, Noel y, Yvette J, Dianne ON, Doungkemol S. Risks of Outpatient Angiography and Interventional Procedures: A Prospective Study *AJR* 2004; **183**: 377-81.
4. Rubin GD, Shiau MC, Schmidt AJ, et al. Computed tomographic angiography: historical perspective and new state-of-the-art using multi detector-row helical computed tomography. *J Comput Assist Tomogr* 1999; **23(suppl1)**: S83-S90
5. C. Berry, J. Kelly, S. Cobbe and H. Eteiba, Comparison of femoral bleeding complications after coronary angiography versus percutaneous coronary intervention. *Am J Cardiol*, 94(2004), pp. 361-36.
6. Singh H, Cardella JF, Cole PE, et al. Quality improvement guidelines for diagnostic arteriography. *J Vasc Interv Radiol* 2002; **13**:1-6
7. Dyet JF, Hartley WC, Galloway JM, Wilkinson AR, Imrie MJ, Cook AM. Outpatient arteriography: a safe and practical proposition? (commentary) *Clin Radiol* 1990; **42**: 114-5
8. Gritter KJ, Laidlaw WW, Peterson NT. Complications of outpatient transbrachial intraarterial digital subtraction angiography: work in progress. *Radiology* 1987; **162**: 125-7.