Catheterization and Cardiovascular Interventions 66:570–572 (2005)

Coronary Embolization of a Gauze Fragment: A Cautionary Case Report

Michael Fischi, MD, and Craig R. Narins,* MD

A 44-year-old woman underwent fractional flow reserve (FFR) assessment of a stenosis of the left circumflex coronary artery. The FFR was within normal limits, however, shortly after leaving the catheterization laboratory the patient developed refractory angina. Repeat angiography demonstrated a new filling defect in the mid left anterior descending coronary artery. Aspiration thrombectomy was performed, and analysis of the effluent revealed a strand of gauze material with adherent thrombus. The gauze fiber was likely unknowingly injected with flush solution during FFR measurement. This previously unreported but potentially dangerous phenomenon underscores the importance of not using a single receptacle to hold moist gauze and saline flush solution, as is the practice in some catheterization laboratories. © 2005 Wiley-Liss, Inc.

Key words: foreign body; coronary angiography

INTRODUCTION

Iatrogenic embolization of exogenous material into the coronary arteries during catheter-based angiography or intervention is a rare but potentially devastating occurrence [1]. In attempt to minimize the possibility of air or other foreign bodies from gaining access to the coronary circulation, closed manifold or other sophisticated contrast injection systems are employed during angiography. Despite the safeguards inherent in these systems, the following case illustrates a potential mechanism by which foreign material can be introduced inadvertently into the coronary circulation.

CASE REPORT

A 44 year old woman with a history of multiple percutaneous coronary interventions and a coronary artery bypass surgery in 1998, with all grafts known to be occluded, was referred for coronary angiography. Her history also included diabetes mellitus, peripheral vascular disease with a left below the knee amputation, hypertension, and hyperlipidemia. Three weeks earlier she began to experience chest pain and dyspnea at rest and with exertion, reminiscent of her usual angina. Her most recent catheterization three months earlier revealed in-stent restenosis of a bare metal stent in the right coronary artery, which was treated with sirolimus-coated stent implantation.

The patient underwent coronary angiography via the right femoral artery approach using 4 French coronary catheters. Contrast injections were administered using the Acist contrast injection system (Acist Medical Systems, Eden Prarie MN). Left ventricular systolic function was normal, and coronary angiography demonstrated mild disease of left anterior descending artery. A small second diagonal branch had a 70% stenosis. The ostial left circumflex artery had a localized 70% stenosis. The first obtuse marginal branch was a small caliber vessel that had a 75% stenosis. The recently stented segment in the proximal right coronary artery was widely patent.

A pressure wire assessment was performed to assess the hemodynamic significance of the ostial LCx stenosis (Fig. 1). Heparin was administered and the left main coronary artery was engaged with a 6 Fr EBU 3.5 guiding catheter. The ostial left circumflex stenosis was crossed with a 0.014″ Radi pressure wire (Radi Medical Systems, Uppsala, Sweden). Intracoronary adenosine was administered through the 3-way stopcock connecting the injection tubing from the Acist system

Cardiology Unit, University of Rochester Medical Center, Rochester, New York

*Correspondence to: Craig R. Narins, MD, Assistant Professor of Medicine, University of Rochester Medical Center, Box 679 C, 601 Elmwood Avenue, Rochester, NY 14642.
E-mail: craig_narins@ urmc.rochester.edu

Received 1 July 2005; Revision accepted 28 July 2005

DOI 10.1002/ccd.20541
Published online 5 October 2005 in Wiley InterScience (www.interscience.wiley.com).

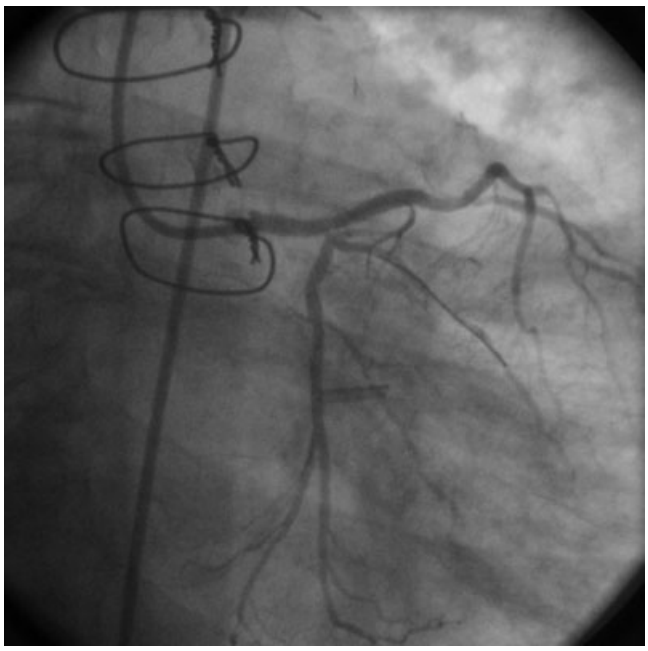

Fig. 1. Diagnostic angiogram demonstrating disease at the left circumflex ostium.

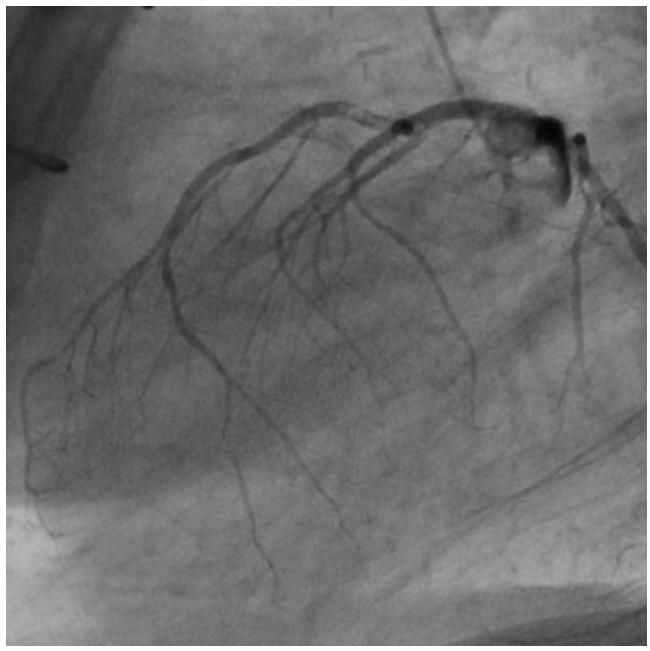

Fig. 2. Relook angiogram reveals a new filling defect in the mid LAD.

to the Touhey–Borst valve and guide catheter, followed by a rapid flush of 10 cc sterile saline administered with a syringe through the same stopcock. In our catheterization laboratory, sterile saline flush solution has traditionally been placed in a small bowl that also contains gauze sponges. The fractional flow reserve was 0.91, and a final angiogram revealed no change in the stenosis appearance and normal flow in the left anterior descending artery. The right femoral arterial access site was closed with an 8 Fr Angioseal and the patient was transferred to the recovery area.

About 10 min later, the patient began to experience chest discomfort and diaphoresis. Her ECG did not demonstrate changes, however the pain persisted despite nitroglycerin therapy and she was brought back to the lab with ongoing pain for repeat angiography. The left circumflex coronary artery was unchanged from her earlier study, however the LAD now demonstrated a prominent filling defect in the mid vessel consistent with thrombus (Fig. 2). There was TIMI-3 flow in the LAD. Additional heparin was administered and eptifiatide was started. Using a 6 Fr EBU 3.5 guiding catheter and a Choice floppy wire, aspiration thrombectomy of the left anterior descending artery was performed with an Export catheter (Medtronic Inc, Minneapolis, MN). Following aspiration there was immediate resolution of both the chest pain and the filling defect (Fig. 3). The aspirated material was strained, and the effluent demonstrated a strand of material consistent with a gauze fiber with adherent thrombus (Fig. 4). The patient was hospitalized overnight and experienced no further chest discomfort.

DISCUSSION

The above case describes the inadvertent administration of a gauze fiber into the left anterior descending artery resulting in intracoronary thrombus formation, a phenomenon that has not been previously reported in the medical literature. The fiber was successfully extracted percutaneously via aspiration thrombectomy. The practice of our laboratory has been to combine saline flush solution and gauze pads in a single sterile bowl, and we suspect that a separated gauze fiber was aspirated while drawing flush solution into a syringe and unknowingly delivered during fractional flow reserve assessment.

Unintended delivery or retention of foreign material in the coronary circulation during percutaneous coronary revascularization is an uncommon event. Retained material typically consists of angioplasty equipment, usually catheter, guidewire or balloon fragments, or undeployed stents. Of 5,400 consecutive angioplasty procedures described by Hartzler et al. in the pre-stent era, 12 patients (0.22%) had complications related to retained equipment [1]. In a review of the literature, Chang et al. noted that surgery was required in half of the reported cases of entrapped angioplasty equipment, however recommended that percutaneous attempts at retrieval should be attempted before surgical retrieval

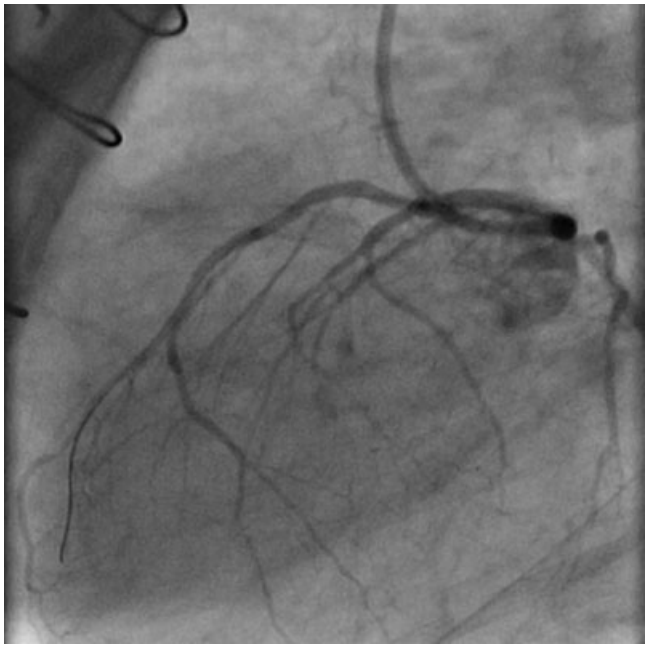

Fig. 3. The filling defect has resolved after aspiration thrombectomy of the LAD.

Fig. 4. A photograph of the aspirated strand of gauze. [Color figure can be viewed in the online issue, which is available at www.interscience.wiley.com].

unless hemodynamic stability is a problem [2]. Various percutaneous techniques, contingent upon the nature and location of the retained material, have been described for foreign body removal, including use of endovascular snares and bioptomes. In our case, we were confronted initially with an angiogram that demonstrated thrombus and were unaware of the presence of a foreign body. Aspiration thrombectomy proved effective in extracting both the gauze fiber and the adherent thrombus.

While embolization of gauze material has not been heretofore described, Whelan et al. have cautioned against the potential adverse histologic effects of vessel contamination with surgical glove powder or textile fibers during stent placement [3]. Such particles were associated with an inflammatory foreign body reaction in a porcine model of coronary stenting and may represent an additional reason to guard against cross contamination of flush solutions with exogenous particulate material.

Although a rare phenomenon, on the basis of our reported case, we strongly recommend that saline flush solution be kept in a separate receptacle than wet sponges during endovascular procedures to hopefully eliminate the potential for unintentional delivery of gauze fragments into the coronary circulation.

REFERENCES

1. Hartzler GO, Rutherford BD, McConahay DR. Retained percutaneous transluminal coronary angioplasty equipment components and their management. Am J Cardiol 1987;60:1260–1264.
2. Chang TM, Pellegrini D, Ostrovsky A, Marrangoni AG. Surgical management of entrapped percutaneous transluminal coronary angioplasty hardware. Tex Heart Inst J 2002;29:329–332.
3. Whelan DM, van Beusekom HM, van der Giessen WJ. Foreign body contamination during stent implantation. Cathet Cardiovasc Diagn 1997;40:328–332.