

Angioplasty Standard of Practice

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PERCUTANEOUS transluminal angioplasty (PTA) and other methods of percutaneous revascularization have become established as effective therapy for selected patients with peripheral and renovascular occlusive diseases. Extensive literature now documents the safety and efficacy of PTA in the management of atherosclerotic and other vascular diseases (1–14). As with any invasive therapy, the potential for benefit to the patient is enhanced by appropriate selection criteria, pre- and postprocedural care, and monitoring. Herein, guidelines for the care of patients undergoing PTA of the peripheral, renal, visceral, and brachiocephalic vessels are presented. In all cases, the care should be directed by the operating physician and treatment decisions should be made after individual consideration of each case. Variation from this standard may be necessary and appropriate depending on the specific clinical circumstances.

PATIENT SELECTION CONSIDERATIONS

The indications for PTA have been outlined elsewhere (15). Patients selected for PTA should fulfill the relevant clinical and morphologic criteria. Documentation should include the following:

1. A written medical history should be available, including a history of the presenting symptoms, indications for the procedure, pertinent medical and surgical history, a list of current medications, allergic history, and vascular risk factors.
2. Physical examination should have been performed, including a detailed vascular examination and a general examination of sufficient depth to exclude significant concurrent illnesses. For patients with lower extremity vascular disease, ankle-brachial indexes should be measured prior to arteriography. In selected cases, measurement of segmental pressures or pulse volume recordings may help define the level of disease and assist in planning the angiographic approach.
3. Complete diagnostic arteriography should precede any vascular intervention. This study should be permanently recorded and should be of sufficient detail to fully characterize the extent of vascular disease that might contribute to the symptomatology. This study may immediately precede intervention when appropriate.
4. Informed consent must be obtained in all cases.
5. Laboratory evaluation may be indicated, and this may include hemoglobin, hematocrit, creatinine, and electrolyte levels and coagulation parameters.
6. Alternative therapies, including surgical revascularization,

should be discussed with the patient and referring physician. Vascular surgical consultation is often helpful in clarifying alternative approaches. All interventions should be done in a setting that enables prompt surgical intervention in emergencies; ideally this setting would be an acute care hospital.

PROCEDURAL CARE

1. All patients should have continuous cardiac monitoring and intermittent blood pressure monitoring during the procedure. A record of vital signs should be maintained.
2. All patients should have intravenous access for the administration of fluids and medications as needed.
3. If the patient is to be sedated, pulse oximetry should be used. A registered nurse or other trained professional whose primary responsibility is to monitor the patient should be present throughout the procedure.
4. In certain circumstances, intraarterial pressure measurements are very helpful in the pre- and postprocedural assessment, and their use is encouraged when indicated.
5. In all cases, postprocedural arteriography should be performed and permanently recorded to document the anatomic result and to identify potential complications.
6. Equipment and medications for

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emergency resuscitation should be immediately available, and the personnel present should be trained in their use.

POSTPROCEDURAL CARE

1. All patients should be observed at bed rest in the initial postprocedural period. Depending on the size of the arteriotomy and on risk factors (see below), bed rest may be required for up to 24 hours.
2. During the initial postprocedural period, skilled nurses or other trained professionals should periodically monitor the puncture site and the status of the vascular distribution distal to the puncture and angioplasty sites.
3. Hemodynamic monitoring is required to detect delayed rupture and hemorrhage in all patients undergoing angioplasty.
4. The patient should be monitored for urinary output, cardiac symptoms, pain, and other indicators of systemic complications. Such monitoring may include laboratory evaluation of renal function at 24–48 hours.
5. The initial ambulation of the patient must be supervised. Vascular perfusion, mobility, puncture site stability, and independent function must be assured.
6. In patients undergoing renal angioplasty, close monitoring of blood pressure is important during the initial 24 hours. Intravenous access should be maintained for fluid resuscitation as needed.
7. Following catheter manipulation in the thoracic aorta or brachiocephalic vessels, neurologic status should be assessed periodically.
8. The operating physician or his/her designee should evaluate the patient's condition after the procedure and be available for continuing care during hospitalization and after discharge.

SELECTION CRITERIA FOR SHORT-TERM OBSERVATION

The duration of postprocedural observation must be individualized. While most patients should be hospitalized for overnight observation, occasionally patients may be candidates for short-term observation (less than 12 hours). Short-term observation may only be considered when all of the following conditions are satisfied:

1. The patient should be capable of independent ambulation prior to the procedure and should have demonstrated stable independent ambulation after the procedure.
2. Mental status should be intact, with the patient capable of following instructions and of detecting changes in symptoms.
3. A responsible adult must be in attendance during the initial night after discharge.
4. The patient should be free of concurrent unstable serious medical illness that might pose a significant increased risk of complication.
5. The patient must have recovered from the effects of sedation.
6. Travel time to the hospital or to another acute care facility should be less than 1 hour from where the patient is to spend the first night after the procedure.

CONTRAINDICATIONS TO SHORT-TERM OBSERVATION

Several factors must be considered when determining the length of postprocedural skilled nursing care. Some of the relative contraindications to short-term observation are listed below. This list is not meant to be comprehensive, and any clinical circumstance that might predispose the patient to significant complication should prompt overnight admission:

1. Patients undergoing renal or visceral arterial angioplasty should not be considered for short-term observation because of the difficulty in detecting delayed complications without skilled nursing care.
2. Patients with poorly controlled hypertension, in whom there

appears to be increased risk of hematoma formation, should be observed overnight.

3. Azotemic patients with significant risk of contrast material-induced nephropathy may benefit from periprocedural intravenous hydration and should be monitored overnight.
4. Patients with coagulopathies or electrolyte abnormalities that require correction should be hospitalized until their conditions become stable.
5. Patients with insulin-dependent diabetes who have labile serum glucose levels in the periprocedural period should be hospitalized until the levels stabilize.
6. Complication occurring during or after angioplasty, including large hematoma, anuria, or persistent nausea and vomiting, should prompt observation until symptoms resolve.

The decision for short-term or longer-term postprocedural observation must be individualized. A given patient's care may vary from the above recommendations for sound clinical reasons. In each case, the decision must be made by the operating physician after review of all pertinent data.

QUALITY IMPROVEMENT

All angioplasty procedures should be monitored within the overall quality improvement program of the facility. Incidence of complications and unexpected admissions should be recorded and periodically reviewed for the opportunity to improve care. These data should be collected in a manner which complies with statutory and regulatory peer-review procedures in order to protect the confidentiality of the peer-review data.

References

1. Burke DR, Gordon RL, Mishkin JD, McLean GK, Meranze SG. Percutaneous transluminal angioplasty of subclavian arteries. *Radiology* 1987; 164: 699–704.
2. Vitek JJ. Subclavian artery angioplasty and the origin of the vertebral artery. *Radiology* 1989; 170:407–409.
3. Tegtmeier CJ, Kellum CD, Ayers C. Percutaneous transluminal angioplasty of the renal artery: results and long-term follow-up. *Radiology* 1984; 153: 77–84.

4. Martin LG, Price RR, Casarella WJ, et al. Percutaneous angioplasty in clinical management of renovascular hypertension: initial and long-term results. *Radiology* 1985; 155:629-633.
5. Martin LG, Casarella WJ, Gaylord GM. Azotemia caused by renal artery stenosis: treatment by percutaneous angioplasty. *AJR* 1988; 150:839-844.
6. Sos TA, Pickering TG, Sniderman K, et al. Percutaneous transluminal angioplasty in renovascular hypertension due to atheroma or fibromuscular dysplasia. *N Engl J Med* 1983; 309:274-279.
7. Becker GJ, Katzen BT, Dake MD. Noncoronary angioplasty. *Radiology* 1989; 170:921-940.
8. Van Andel GJ, van Erp WF, Krepel VM, Breslau PJ. Percutaneous transluminal dilatation of the iliac artery: long-term results. *Radiology* 1985; 156:321-323.
9. Johnston KW, Rae M, Hogg-Johnston SA, et al. 5-year results of a prospective study of percutaneous transluminal angioplasty. *Ann Surg* 1987; 206:403-412.
10. Gallino A, Mahler F, Probst P, Nachbur B. Percutaneous transluminal angioplasty of the arteries of the lower limbs: a 5-year follow-up. *Circulation* 1984; 70:619-623.
11. Hewes RC, White RI Jr, Murray RR Jr, et al. Long-term results of superficial femoral artery angioplasty. *AJR* 1986; 146:1025-1029.
12. Rooke TW, Stanson AW, Johnson CM, et al. Percutaneous transluminal angioplasty in the lower extremities: a 5-year experience. *Mayo Clin Proc* 1987; 62:85-91.
13. Spence R, Freiman DB, Gatenby R, et al. Long-term results of transluminal angioplasty of the iliac and femoral arteries. *Arch Surg* 1981; 116:1377-1386.
14. Bakal CW, Sprayregen S, Scheinbaum K, Cynamon J, Veith FJ. Percutaneous transluminal angioplasty of the infrapopliteal arteries: results in 53 patients. *AJR* 1990; 154:171-174.
15. Standards of Practice Committee of the Society of Cardiovascular and Interventional Radiology. Guidelines for percutaneous transluminal angioplasty. *Radiology* 1990; 177:619-630/*J Vasc Interv Radiol* 1990; 1:5-15.