# Acute Axillo-Subclavian DVT

This case report presents a novel management strategy for addressing acute axillo-subclavian deep vein thrombosis.

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It is recognized that venous thromboembolic disease is an important cause of morbidity as well as mortality in hospitalized patients. Despite recent advances in the diagnosis, treatment, and prevention of venous thromboembolism, the overall incidence may have changed only slightly in the past 30 years. The use of thrombolytic therapy for treating deep vein thrombosis (DVT) is a controversial issue. The theoretical advantages include clot dissolution, which may lead to recanalization, restoration of normal venous hemodynamics, and the prevention of venous valvular damage. The indications for thrombolytic therapy in DVT are limited to a select group of patients. In the following case presentation, we describe the use of thrombolytic therapy for the treatment of an acute upper extremity DVT.

## CASE PRESENTATION

A 54-year-old woman presented with a chief complaint of left upper-extremity discoloration and swelling. Four days before presentation, the patient had undergone revision of a permanent pacemaker via the left subclavian vein; the pacemaker was initially placed 10 months earlier. An acute axillo-subclavian DVT was documented by ultrasound, and she was started on full-dose anticoagulation with unfractionated heparin. Because the patient's arm swelling persisted despite elevation and anticoagulation, she was taken to the angiographic suite for possible endovascular intervention.

### Venogram Findings

Venography was performed from the left brachial vein and confirmed thrombotic occlusion of the left subclavian vein (Figure 1).

## INTERVENTION

Given the persistent symptoms and swelling despite full-dose anticoagulation, interventional therapy was initiated. The thrombotic occlusion was easily crossed with a

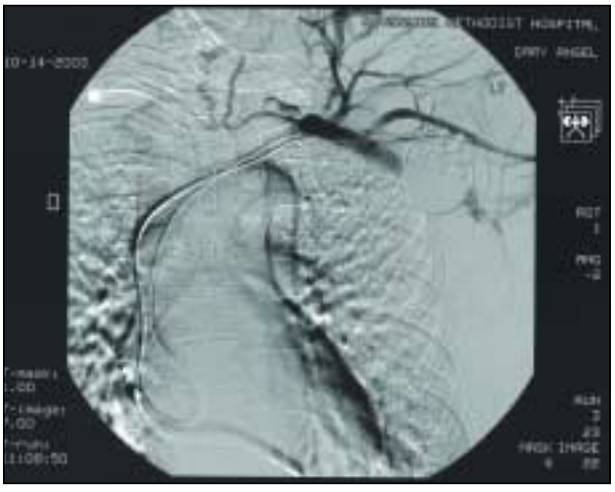

**Figure 1. Left subclavian venogram demonstrating complete thrombotic occlusion at site of permanent pacemaker leads.**

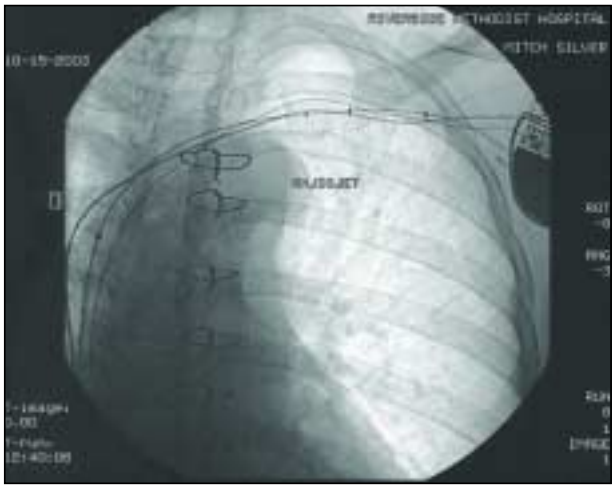

**Figure 2. AngioJet (Possis Medical, Inc., Minneapolis, MN) of the left subclavian vein after urokinase infusion.**

**TABLE 1. SELECTION OF UROKINASE OVER AVAILABLE PLASMINOGEN ACTIVATORS**

| | Nonfibrin-Specific Plasminogen Activators: Urokinase | Fibrin-Specific Plasminogen Activators |
|---|---|---|
| **Dose** | Approximately 20 years of published data confirming safety and efficacy of urokinase, including several large-scale randomized trials.[1-3] Urokinase was additionally evaluated in multiple vascular beds and in high-risk patient populations.[4-7] | Not as clearly defined data regarding proper dosing with a given clinical situation. There is a current effort to lower the dose to reduce bleeds. The question arises as to whether this strategy will decrease efficacy. |
| **Duration of Dose** | Decreased risk of bleeding when urokinase is infused for longer periods of time compared to fibrin-specific plasminogen activators.[8-11] | If it is necessary to infuse a lytic agent overnight, there have been studies showing that more fibrin-specific thrombolytic agents have an increased risk of bleeding in these longer infusions.[8-11] |
| **Adjunctive Heparin** | The published data for urokinase show support for using unfractionated heparin in conjunction with urokinase when the proper clinical situation warrants use of both agents simultaneously.[1-7,12-14] | Much fewer data to base clinical decision making on compared to urokinase when using adjunctive unfractionated heparin. Evidence-based medicine already in place for use of urokinase with unfractionated heparin. |
| **Fragment X** | There is no accumulation of Fragment X with the use of urokinase.[15] | Fibrin specificity may result in greater bleeding via the resulting generation of fibrin degradation products E and Fragment X.[15] |
| **Types of Procedures/Patients** | Well defined in peripheral vascular disease patients including high-risk groups. | Not well defined in literature. Limited data to support its use in high-risk patients. |

0.035-inch, hydrophilic, angled Glidewire (Terumo Medical Corporation, distributed by Boston Scientific Corporation, Natick, MA), and a 0.035-inch Cragg-McNamara infusion catheter (Micro Therapeutics, Inc., Irvine, CA) was placed directly into the left axillary and subclavian vein to perform thrombolytic therapy. A bolus of 120,000 units of urokinase (Abbokinase; Abbott Laboratories, Abbott Park, IL) was given, followed by an infusion of urokinase at 80,000 units per hour, along with adjunctive full-dose anticoagulation with unfractionated heparin. Table 1 presents comparative information regarding the decision to use urokinase over other available plasminogen activators.

After 18 hours, the patient was taken back for a second venogram. There was 90% resolution of thrombus burden, with a persistent intraluminal filling defect around a fibrotic venous stricture at the site of the permanent pacemaker lead. Thrombectomy using the AngioJet device was performed (Figure 2), and adjunctive PTA was done with a 12-mm diameter X 40-mm length P3 balloon (Cordis Corporation, a Johnson & Johnson company, Miami, FL) (Figure 3).

## OUTCOME

The final venogram demonstrated an adequate lumen with brisk inflow into the superior vena cava (Figure 4). The patient was discharged home the next day with

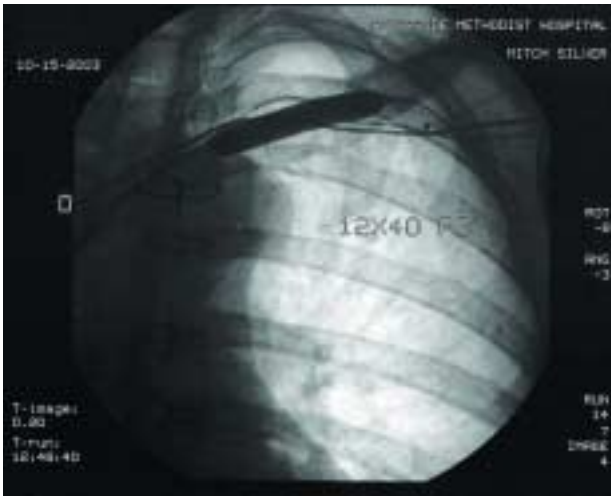


**Figure 3. Left subclavian vein PTA with a 12-mm diameter X 40-mm length P3 balloon.**

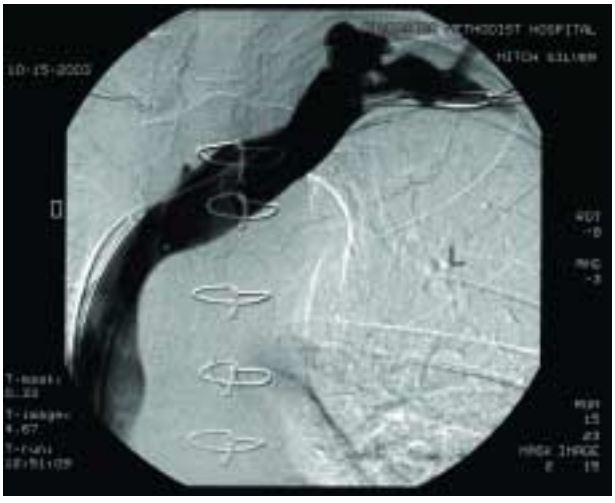

**Figure 4. Final venogram demonstrating a widely patent left subclavian vein.**

complete resolution of her left upper-extremity swelling, a stable hemoglobin level, and full-dose anticoagulation utilizing Lovenox (Aventis Pharmaceuticals, Bridgewater, NJ) SQ injection 80 mg SQ b.i.d. as a bridge to coumadin (Bristol-Meyers Squibb Company, New York, NY) therapy. A follow-up venous ultrasound was scheduled to be performed in 3 months.

## CONCLUSION

Thrombolytic therapy for DVT should be considered in patients with phlegmasia cerulea dolens, superior vena cava syndrome, extensive iliofemoral involvement, and younger individuals with axillo-subclavian thrombosis. Catheter-directed thrombolytic infusions delivered selectively into the involved vein are preferred to provide optimal drug distribution. Adjunctive mechanical thrombectomy plays an important role in managing these challenging patients. The use of urokinase is well defined in peripheral vascular disease patients, including high-risk groups, and has the theoretical advantage of less Fragment X generation that may lead to diminished bleeding complications. ■

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