

**CHAPTER 10**  
**AXILLARY/SUBCLAVIAN VEIN THROMBOSIS (CLOT)**  
**AND IT'S TREATMENT**

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**Introduction**

**Venous thrombosis** or blood clots occurring in the large veins draining the arm is termed **axillo-subclavian vein thrombosis**. Some people are prone to developing **venous thrombosis** from muscular and skeletal abnormalities surrounding the **subclavian vein**. Such abnormalities are generally located in the area of the body called the **thoracic outlet** where nerve, artery, and **vein** go from the neck and chest to the arm. Abnormal muscle bands or abnormal rib development can “pinch” the **subclavian vein** creating a severe narrowing as the arm rotates around the chest in its normal range of motion. Those having this altered anatomy may then develop **venous thrombosis** of the **subclavian vein** from repetitive trauma to the **vein** as the arm moves. Unusual and forceful arm motion as happens in pitching or other prolonged labors such as house painting or window washing may cause **vein thrombosis**. When **thrombosis** occurs in the **axillo-subclavian vein**, marked arm swelling occurs with a typical bluish discoloration of the hand and fingers.

**Diagnosis**

An accurate history and physical examination in addition to the rapid presence of significant arm swelling and tenderness over the upper chest makes the diagnosis, especially when such findings follow the type of activity known to cause **thrombosis**. Appropriate confirming studies can show the **thrombosis** (blood clot) in the **axillo-subclavian vein**. In the past, contrast **venogram** (placing a needle in the **vein** and injecting x-ray sensitive dye into the **vein**) was the preferred study. Presently, the confirming study is high quality **computerized tomography (CT) scanning** or **magnetic resonance imaging (MRI)** studies.

**Management**

The treatment of **axillo-subclavian vein thrombosis** has undergone change over the years. If no treatment is provided except for arm elevation and pain relief, the patient can have long lasting arm swelling and discomfort due to the venous blockage. The arm remains heavy, stiff, swollen, and generally uncomfortable. **Blood thinners** such as **heparin** or **Coumadin** are part of the treatment for this disorder but these drugs do not actually remove the clot or the abnormal anatomy which is “pinching” the **vein**. Use of a **blood thinner** alone results in chronic disability and persistent swelling and pain in up to 75% of patients.

Better results have been obtained when drugs that are made to breakdown or dissolve the **venous clot (thrombolytic agents)** are placed into the **clot**. They are best placed into the

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**clot** by a catheter (small plastic tube) which is pushed right into the **clot**. This catheter is placed into a **vein** further out in the arm and pushed to the place of clotting. It is not uncommon for an overnight delivery of these drugs to achieve complete **clot** removal. While **thrombolytic agents** can dissolve the **clot**, it is recommended to continue **anticoagulation** with **heparin** after clot removal since recurrence of **thrombosis** is common if this is not done. Once the **venous clot** has dissolved, marked improvement in arm swelling occurs. The impingement on the **subclavian vein** must also be taken care of at the level of the ribcage. Treatment with surgery designed to eliminate the “pinch” on the **subclavian vein** is necessary for best results. This typically means removal of abnormal muscle bands and possibly the first rib to free up the entire **vein**. If the vein is scarred from repeated “pinching”, pushing the vein open from the inside can be done by placing a dilation balloon and metal support (a **stent**) within the **subclavian vein** during or after surgery. An alternative to **stent** placement can be to directly patch the **vein** open at the time of surgery.

Complete treatment may include **catheter directed drug infusion** to dissolve the **clot**, **anticoagulation (blood thinning)** therapy and the surgical removal of the abnormal rib and muscle anatomy. The best results are achieved when performed at the time of diagnosis or by a staged procedure within a short time (six weeks to three months) after clotting. Delays in treatment after initially finding the **clots** or clot removal that does not include eliminating the mechanical pinching of the axillo-subclavian vein has been associated with a higher number of patients with chronic complaints and arm related symptoms that cause disability.

## Conclusion

**Axillo-subclavian vein thrombosis** occurs as a result of abnormal muscle and/or rib anomalies of the **thoracic outlet** at the base of the neck and ribcage. Professional athletes to housewives can be affected. Treatment is best performed close to the time of diagnosis and involves three steps which includes dissolving the **clot**, maintaining **anticoagulation** (stopping any new clots from forming) with a **blood thinner** and surgical treatment to eliminate the external compression on the **subclavian vein**.

## Commonly asked questions

### What is thoracic outlet syndrome and who can be affected by it?

**Thoracic outlet syndrome (Figure 1)** involves a group of arm symptoms produced by abnormal muscles, scar bands or bones (rib or collar bone) located in the upper ribcage which pinch the main nerves, artery and **vein** of the arm as they leave the neck and chest to get to the arm. **Axillo-subclavian vein thrombosis** (clotting of the major **veins** of the upper arm) affects approximately five to eight percent of all patients with **thoracic outlet syndrome**. When pinching of the **subclavian vein** is the major compression, **venous thrombosis (blood clots)** can occur often after long periods of physical activity or unusual movements of the upper arm. Thus, “weekend warriors”, housewives with long period of window washing, house painters, weightlifters, professional athletes such

as volleyball players, and baseball pitchers can all be affected by this disorder. Left untreated, chronic fatigue, arm swelling and discomfort are the norm. The common problem affecting all those people involves **subclavian vein** compression and injury.

### **Can both arms be involved?**

Yes. **Thoracic outlet syndrome** disorders can be on both sides in over 50% of patients. While it is most common in the dominant arm, it can also occur in the non-dominant arm.

### **What type of disability remains with treatment?**

As mentioned, left untreated, chronic arm symptoms such as fatigue, swelling, and aching is common. This can make it difficult for a person to perform their normal activities, sports or job. If promptly treated, recovery is relatively rapid. Normal activity can usually take place in four to six weeks. Chronic **anticoagulation (blood thinner)** treatment with **Coumadin** may be necessary for a long period of time.

**Figure 1:** The upper panel is an artist impression of a venogram (an X-ray agents injected directly into the major veins of the upper arm and chest) showing pinching of the vein at the thoracic outlet. The lower panel shows the clavicle (upper bone) pinching the subclavian vein as it goes over the first rib to more clearly show what is happening in the upper panel. Successful catheter directed thrombolysis (clot removal) has reopened the vein but the narrowing can easily be seen that requires surgical treatment.

