

Mechanical Thrombectomy and Venous Stenting for Iliofemoral Deep Vein Thrombosis

Introduction

Deep vein thrombosis (DVT) is the medical term for blood clots in major veins. DVT is a common medical condition, and is often found in the lower limbs. Predisposing factors include prolonged immobilization, underlying malignancy, May-Thurner syndrome (anatomical compression of left iliac vein between the right common iliac artery and lumbar vertebrae), and genetic anticoagulant deficiencies.

Typical symptoms of DVT include leg pain, leg swelling, and skin discolouration of the leg. Systemic anticoagulation is the standard treatment for DVT. However, complications of DVT are not uncommon in individuals despite adequate anticoagulation therapy, and are more often found in certain subsets of patients. Complications of DVT include but are not limited to: pulmonary thromboembolism, phlegmasia cerulea dolens, chronic venous hypertension, venous ulcers, venous gangrene, and post-thrombotic syndrome.

Mechanical thrombectomy +/- venous stenting has evolved as a safe means to treat DVT in patients who are contraindicated for anticoagulation, in patients whose DVT does not resolve with anticoagulation, in patients with rapidly evolving complications of DVT, in patients with severe and lifestyle limiting symptoms of venous stenosis, and in patients who are anatomically predisposed to recurrent DVT (May-Thurner syndrome). It has reduced morbidity and mortality when compared with surgical thrombectomy. It has been shown to be effective in improving symptoms related to DVT, reducing its complications and reducing risk of recurrent DVT.

The Procedure

- The procedure will be performed under local anaesthesia and aseptic technique.
- The interventionalist will puncture a vein at your groin region or at the back of your knee depending on the extent of your DVT on pre-procedure imaging. After the needle is correctly positioned in the vein, a slender guidewire is placed through the needle into the vein. The needle is then withdrawn, allowing a plastic tube (the sheath) to be placed over the guide wire into the vein.
- Under X-ray guidance, a fine catheter will be advanced into your vein through the sheath, and special dye (contrast medium) will be injected through the catheter and X-rays will be taken to evaluate the extent of DVT and plan the intervention procedure.
- A special mechanical thrombectomy device catheter will then be inserted into your vein via the sheath up to the site of DVT. This catheter will remove the clot either by 1) mechanical destruction of clot 2) injection of high-pressure jets of saline mixed with drugs to dissolve the clot or 3) by ultrasound waves. The means of clot destruction will depend on the mechanical thrombectomy device catheter selected by the interventionalist.
- After mechanical thrombectomy described above, the interventionalist will decide if stent/s need to be inserted. The main factors which will influence whether stents are inserted are 1) anatomical predisposition to impaired venous drainage (May-Thurner syndrome) 2) risk of recurrent DVT.
- If venous stenting is decided, the interventionalist will insert a compressed stent via the sheath and deploy the stent in the vein in the pelvis or groin region. The interventionalist may then insert an angioplasty balloon catheter up to the stent to improve the degree of stent opening.

- A metallic device, Inferior Vena Cava (IVC) filter, may sometimes be inserted in IVC to prevent pulmonary embolism.
- All catheters as well as the sheath will be removed at the end of the procedure. Pressure will be applied to the groin or knee region to prevent bleeding. The opening in the skin will then be covered with dressing.
- The duration of the procedure is different for every patient; it depends on the complexity of the condition as well as whether venous stenting is necessary / needed.
- Your vital signs (e.g. blood pressure, pulse) and lower limb circulation will be monitored during and after the procedure. Attention should be paid on the skin puncture site to make sure there is no bleeding from it.

Potential Complications

- The overall complication rate with mechanical thrombectomy +/- venous stenting is low.
- Major complications include:
 - Recurrent DVT or stent thrombosis (<5% at 6 months after procedure, up to about 15% at 2 year after procedure).
 - Symptomatic pulmonary embolism (<1%).
 - Inferior vena cava thrombosis or contralateral limb venous thrombosis (<1%).
 - Stent migration (<2%).
 - Stent fracture (<2%).
 - Retained catheter.
 - Groin or retroperitoneal hematoma requiring transfusion or surgery.
 - Arteriovenous fistula at puncture site.
 - Breakage and knot forming of catheter or guidewire is very rare, this may require surgical removal.
 - Contrast media associated nephrotoxicity.
 - The overall adverse reactions related to iodine-base non-ionic contrast medium is below 0.7%. The mortality due to reaction to non-ionic contrast medium is below 1 in 250,000.
- Minor complications include:
 - Fever and localized pain.
 - Puncture site complications such as hematoma, bruise and pain.
 - Complications related to contrast medium injected - rash, urticarial.

Before the Procedure

- Your referring doctor will ask you to sign a consent form for this procedure. You should volunteer to your doctor any history of allergy to food and drugs, history of asthma, urticaria, eczema and allergy to contrast medium.
- Check for any bleeding tendencies and correct it if possible.
- Fast for 6 hours before the examination.
- Empty the bladder before the procedure.
- Skin preparation of the puncture site.
- During the examination, you are advised to listen carefully to the instructions given by our staff.
- For diabetic patient on drug - consult clinician concerned for the adjustment of insulin dosage if necessary.

After the Procedure

- After the catheter is removed, the puncture site has to be compressed for at least 10mins.
- Continue to watch for evidence of secondary bleeding and swelling at the puncture site.
- Continue to check blood oxygen level, blood pressure and pulse, and lower limb circulation.
- You may need to have bed rest.
- You may need to continue to fast or take diet as tolerated depending on your condition.
- For diabetic patient on drug - consult clinician concerned for the adjustment of insulin dosage if necessary.

Remarks

This is general information only and the list of complications is not exhaustive. Other unforeseen complications may occasionally occur. The actual risks may be different for different patients. During the operation, unpredictable condition may arise, and additional procedures may be performed if necessary. For further information, please contact your doctor.