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Case Report

A Case Of Deep Vein Thrombosis With Pharmaco-Mechanical Catheter Directed Thrombolysis Therapy

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Deep Vein Thrombosis (DVT) is a formation of blood clots condition in deep vein caused by multiple risk factor. The goals of acute phase of DVT management is prevent expansion of thrombus, limiting the progressivenes of leg swelling and also prevent venous dysfunction. In this case report, we present a case of DVT with Pharmaco-mechanical Catheter Directed Thrombolysis therapy which provides satisfactory outcomes during therapy and follow up.

Keyword: **Deep Vein Thrombosis, DVT, PDCT, Thrombolysis.**
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INTRODUCTION

Venous thrombosis formed due to clotting of blood in the veins.[1] Most of these occur in deep veins in the legs known as deep vein thrombosis (DVT) which is often the onset of pulmonary embolism (PE). Reported annual incidence for DVT varies from 45 to 117 per 100.000 person-years with a risk of developing Pulmonary Embolism (PE) ranging from 20% to 50%.[3]
The causes of thrombosis are divided into two, those related to three main factors described by Virchow's triad. Virchow's Triad describes factors that lead to increased thromboembolic risk: (1) venous stasis, (2) vascular damage, and (3) hypercoagulability.[2]

Venous thrombosis is an of multiple causes combine with several risk factors often occurring together at one time. The risk factors for thrombosis are hereditary then aggravated by the presence of acquired risk. Manifestation of DVT included pain depending on severity of thrombosis, edema and change of skin colour in 20% of cases.[3] However, Potential complications of DVT include the following as many as 40% of patients have silent PE when symptomatic DVT is diagnosed, Paradoxic emboli, Recurrent DVT and Postthrombotic syndrome (PTS).[12]

Management of DVT is done in definitif case considering that the drugs can cause serious side effects. The goals of acute phase of DVT management is prevent expansion of thrombus, limiting the progressivenes of leg swelling lysis then remove blood clots and prevent venous dysfunction or post-thrombotic syndrome, and Prevent embolism. Pharmacological management consists of anticoagulants and fibrinolytics such as *Unfractionated Heparin, warfarin, Low-Molecular-Weight Heparin* (LMWH), and trombolitic therapy.[4] Another option is non pharmacological therapy that aims to reduce morbidity in acute phase and reduce the incidence of posttrombosis syndrome which is usually characterized by pain, stiffness, edema, paresthesias, erythema, and edema. In This article we described a case of Deep Vein Thrombosis with Pharmaco-mechanical Catheter Directed Thrombolysis therapy. Percutaneous Mechanical Thrombectomy (PMT) combined with CDT is used in PDCT to minimize thrombus burden.[1,4] by improving thrombolysis results with a substantial decrease in lytic doses, shorter treatment times associated with lower radiation doses, and less bleeding complications.[4]

CASE PRESENTATION

A 58 years old woman visit our vascular clinic in Prof. R.D. Kandao Hospital on March 17th 2021 with chief complaints of redness on the left leg (calf) accompanied by swelling and pain since 1 week ago. Initially patient complaint pain, then redness in few days later. Patient have a lump in the left neck too. Medical history of patient is underwent ovarian tumor removal surgery 2 years ago and done 25 times radiotherapy. Physical examination: in cruris left region shown a swollen, reddish and tenderness. (figure 1).

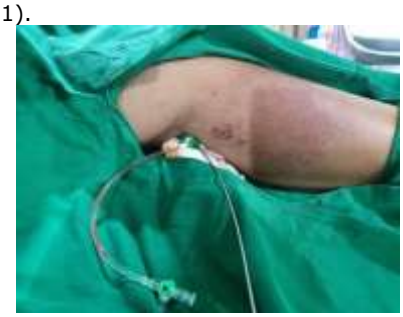


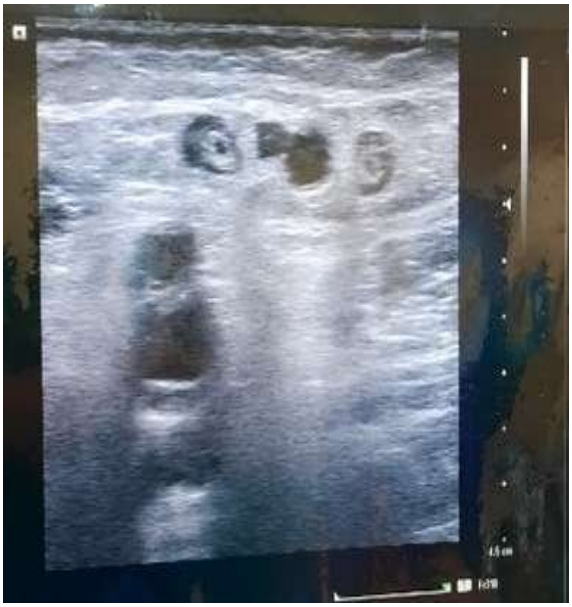
Figure 1. clinical examination of patient.

Homan sign is positive. Examination of distal extremities is : femoral artery pulse ++ / ++, popliteal artery pulse ++ / ++, posterior tibial artery pulse ++ / ++, dorsalis pedis artery pulse ++ / ++. Treatment plan for this patient is Inpatient for a thrombectomy therapy with PCDT then work up with laboratory status, Dopler ultrasound and venography. Her lab result is in normal as baseline range but her D-Dimer was increase (15.10 ug/ml) (normal range <0,5 ug/ml). Her doppler USG shown a thrombus in femoral juction vein and in proximal of saphena magna vein, non compressible and thickening of vein wall. (Fig. 2 and 3).

a

b

Figure 2. a. A thrombus is found at the femoral junction vein. B. In the proximal saphenous vein, a thrombus appears, the femoral vein is not compressible, the vein wall is also thickened.



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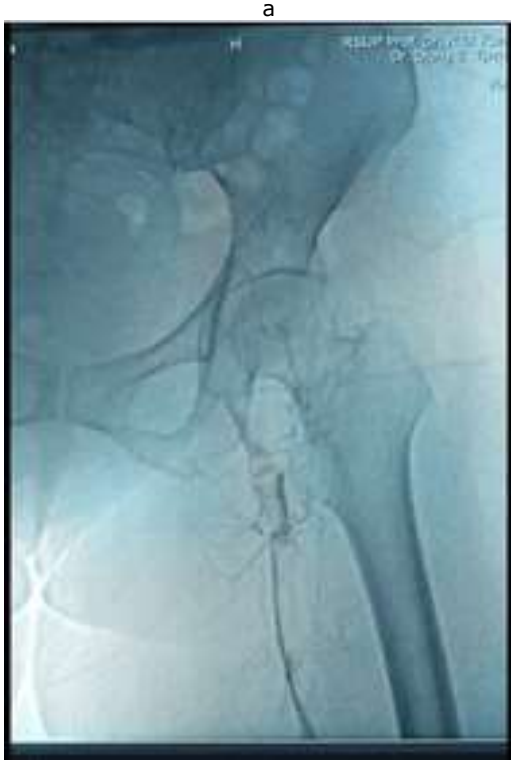

b

Figure 3.A. get enlarged lymph nodes in the inguinal region. B. Thrombus in venography.

The patient underwent surgery on March 19th, 2021. Patient then performed venography and shown thrombus from the popliteal vein to the femorocomunis vein. proximal flow is not visualized (from the ileol vein to the ineferior cafa vein junction). Pharmacomechanical then performed using aspiration angiojet / thrombectomy starting from the inferior vena cava branching, iliac veins, femoral veins to popliteal veins. evaluation of the thrombus showed corrected flow and blood began to fill from the popliteal, femoral, iliac veins to well-visualized bifucatio of the inferior vena cava. Figure 4 shown a clear vein without thrombosis.

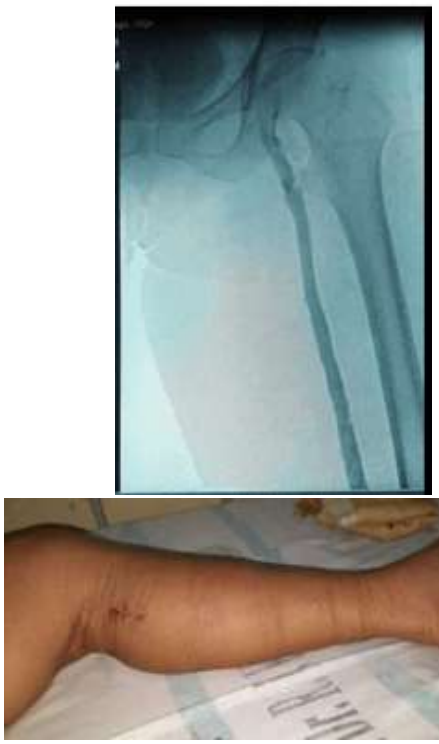

Fig. 4. A.The thrombus is perfectly done. B. Clincal examination of leg after surgery procedure.

After the procedure, patient then given heparin therapy of 20,000 in Nacl 0.9% per 24 hours and medical gradual compression was performed. Her physical examination after surgery is no visible redness and pain completely relieved. Total inpatient days is three. Her therapy after discharged from hospital was Simarc tablet once a day at night, ardium 500mg and Xarelto 15mg twice a day respectively, cilostazol 2x100mg, and using therapeutic stockings. Follow up patient report that patient no longer feel pain and can carry out daily activities properly.

Fig. 5. Clinical examination of patient on follow up

DISCUSSION

Percutaneous mechanical thrombectomy entails the insertion of a catheter into the venous system, followed by fluoroscopic guidance to the target vessel and the subsequent implantation of a thrombolytic agent such as tPA into the thrombus.[5] The catheter is flushed out, and the implantation is usually completed in less than 24 hours.[2,5]

Indication for DVT thrombolysis include : Extensive thrombosis with high risk of pulmonary embolism, Proximal DVT (iliofemoral or femoral vein), Threatened limb viability, Underlying predisposing anatomic anomaly, Good physiological reserve (18–75 years old), Life expectancy over 6 months, Recent onset of symptoms (14 days), and the absence of contraindications to thrombolysis.[1] However, the contraindication of thrombolysis is Bleeding diathesis/ thrombocytopenia, Organ specific bleeding risk (e.g. recent myocardial infarction, cerebrovascular accident, gastrointestinal bleed, surgery, or trauma), Renal or hepatic failure, Malignancy (i.e. brain metastases) and Pregnancy.[1]

In the case of acute DVT, several studies have shown that PDCT is successful in restoring venous patency and reducing symptoms. By dissolving irregular blood clots, catheter-directed thrombolysis treats artery blockages and increases blood flow.[6] A blood clot, also known as a thrombus, can cut off blood flow to areas of the body, causing significant damage. PCDT is more effective than anticoagulation alone in preventing PTS.[2] In fact, the amount of thrombus left over at the end of PCDT treatment is directly linked to the risk of PTS. Patients tend to have a low risk of PTS if 90 percent or more of the thrombus is removed.[1] PCDT also lowers the risk of DVT recurrence. While PCDT is expensive, it can still be a cost-effective alternative to conventional anticoagulation.[7] The most common side effect of CDT is bleeding. Significant bleeds are normally limited to the puncture site, though intracranial bleeding is uncommon.[8] During CDT, careful clinical monitoring is needed, which should prevent the majority of the potentially serious consequences of venous access site bleeds.[9] Another complication of PDCT is Pulmonaly Embolism (PE). Some centers have reported an increased incidence of pulmonary embolism following percutaneous treatments, but this has not been supported by registry reports or trials data.[7]

In this case, the patient presented with complaints of redness in the left leg since 1 week ago. complaints begin with pain and then redness thereafter. Based on the results of the examination, the patient was diagnosed with DVT at the left ileofemoropopliteal level. The patient was also planned to undergo a thrombectomy with PDCT. PDCT a combine CDT and percutaneous mechanical thrombectomy (PMT) devices in order to enhance early mechanical thrombus removal and facilitate clot lysis. Several devices exist to perform PMT, but despite promising early reports and case series, the best design and outcomes remain unknown. Rotating sinusoidal dispersion wires (Trellis-8, Bacchus Vascular) are one type of device. Before the procedure, the patient underwent TIVA (Total Intra Venous Anesthesia), a general anesthetic technique in which induction and maintenance of anesthesia is obtained using only a combination of anesthetic drugs that are administered intravenously without the use of inhalation anesthetics. Furthermore The thrombus aspiration started directly with perfusion solution (unfractionated heparin 20.000 IU in 500 ml saline). Angiography was performed immediately after thrombectomy. Patient then given pharmamechanical aspiration angiojet to shattered thrombus. Based on zhu et.al (2017) that studied the efficacy and complications of using Angiojet rheolytic thrombectomy in treating acute lower extremity deep vein thrombosis (DVT) to 22 patients with acute lower extremity DVT who were treated with Angiojet rheolytic thrombectomy. Result show that clinical

symptoms were relieved immediately after operation in all 22 patients. The disparity in thigh circumference between the affected and healthy sides decreased from preoperative (4.5±0.6) cm to postoperative (1.0±0.4) cm, with a statistically significant difference ($P<0.05$).[9] No serious complications such as pulmonary embolism or hemorrhage occurred.[9]

Following the surgery treatment, patient given heparin 2000 IU in Nacl 0,9%/24 hours and underwent medical gradual compression. After dicharged from hospital, patient given 2 mg oral anticoagulation therapy as per the guidelines. patients also wore elastic compression stockings with a pressure range of 30 to 40 mmHg.

Based on patterson study (2010) patients who received CDT had a higher health-related quality of life than those who received systemic anticoagulation alone. Furthermore, patients with proximal DVTs who were treated with CDT had higher functional scores and less PTS symptoms than those who were treated with systemic anticoagulation.[1]

The indication of anticoagulant administration is stronger in proximal DVT (popliteal, femoral and iliac veins) than distal DVT (calf DVT). This is because proximal DVT has greater complications such as embolization and death. All patients receiving anticoagulants should be assessed for their risk of bleeding during therapy. Systemic infusion of recombinant tissue plasminogen activator (rt-PA), a drug with greater fibrin affinity than previous fibrinolytic agents, has also been studied for the treatment of DVT. Turpie et al observed that a 4-hour systemic rt-PA infusion (0.5 mg/kg) achieved 50 percent clot lysis more frequently than heparin alone (58 percent versus 0 percent , P0.002), with a trend toward reduced PTS in patients who had 50 percent clot.[11] Although studies have shown that rtPA may lyse human DVT, they also indicate that systemic administration can not reliably achieve a therapeutic rt-PA concentration at its target sites within the thrombus, resulting in only modest clot removal efficacy (29 percent to 58 percent).[11] In a randomized controlled trial, the use of intermittent rt-PA injections into nearby veins in the affected leg was also investigated, but it was not found to be superior.[11]

CONCLUSION

In patients with extensive DVT, PDCT with adjunctive thrombolytic therapy is an option of minimally invasive, low-risk therapeutic alternative associated with clinical benefits such as thrombus clearance, patency, and symptom relief.

REFERENCES

1. Yang X, et al. Clinical course and outcomes of critically ill patients with SARS-CoV-2 pneumonia in Wuhan, China: a single-centered, retrospective, observational study. Lancet Resoir Med. 2020; 8(5): 475-481
2. He F, Deng Y, Li W. Coronavirus disease 2019: What we Know?. Journal of Medical Virology.2020; 92(7): 719-725.
3. IDF diabetes atlas, 6th edition. Available at: http://www.idf.org/ diabetesatlas. Accessed Mei, 2021.
4. Armstrong DG, Boulton AJM, Bus SA. Diabetic Foot Ulcers and Their Recurrence. N Engl J Med. 2017; 376(24): 2367-2375.
5. Hingorani A, et al. The management of diabetic foot: A clinical practice guideline by the Society for Vascular Surgery in collaboration with the American Podiatric Medical Association and the Society for Vascular Medicine. Journal Vascular. 2016; 63: 3s-21s
6. Bader MS. Diabetic foot Infection. *Am Fam Physician.* 2008; 78(1): 71-79, 81-82
7. Armstrong DG, Fiorito JL, Leykum B. Surgical Management of diabetic foot ulcers. In: Surgical Wound Healing and Management. 2th. Edition. USA: Taylor & Francis Group. 2012
8. Eltwisy HO, et al. Pathogenesis of *Staphylococcus haemolyticus* on primary human skin fibroblast cells. 2020; 11(1): 1142-1157
9. Everett E, Mathioudakis N. Update on Management of Diabetic Foot Ulcers. Ann N Y Acad Sci. 2018; 1411(1): 153-165
10. Nain PS, et al. Role of Negative Pressure Wound Therapy in Healing of Diabetic Foot Ulcers. J Surg Tech Case Rep. 2011. 3(1): 17-22
11. Walsh JW, et al. Association of diabetic foot ulcer and death in a population-based cohort from the United Kingdom. Diabet Med. 2016; 33(11): 1493-1498
12. Atri A, Kocherlakota CM, Dasgupta R. Managing diabetic foot in times of COVID-19: time to put the best 'foot' forward. Internationa Journal of Diabetes in Developing Countries. 2020; 1: 1-8
13. Schaper NC, Netten JJV, Hinchliffe RJ, Apelqvist J, Bus SA, Lipsky BA. International Working Group on the Diabetic Foot (IWGDF). (2019). IWGDF guidance on the prevention of foot ulcers in at-risk patients with diabetes. Diabetes Metab Res Rev
14. Kalish J, Hamdan A. Management of diabetic foot problems. Journal of Vascular Surgery. 2009; 51(2): P476-486
15. Rose JF, et al. Spit-Thickness Skin Grafting the high-risk diabetic foot. Journal of Vascular Surgery. 2014; 59(6): 1657-1663
16. Anderson AJ, et all. Split thickness skin grafts for the treatment of non-healing foot and leg ulcers in patients with diabetes: a retrospective review. Diabetic Foot and Ankle. 2012: 1-7
17. Ramanujam CL, et al. Split-Thickness Skin Grafts for Closure of Diabetic Foot and Ankle Wounds. 2010; 3(5): 231-240