

## Long-term outcome of transfemoral thrombectomy in patients with acute iliofemoral vein thrombosis

M. Mozafar, MD.<sup>1</sup>, M. Talebianfar, MD.<sup>2</sup>

*Department of General Surgery, Shohada-e-Tajrish Hospital, Shahid Beheshti University of Medical Sciences, Tehran, Iran.*

### Abstract

**Background:** The optimal therapy of acute iliofemoral venous thrombosis is still a matter of debate. The purpose of our study was to evaluate the late results of iliofemoral thrombectomy with regard to the prevention of the development of a Post Thrombotic Syndrome (PTS).

**Methods:** During 2000-2003, 18 patients underwent transfemoral venous thrombectomy for acute iliofemoral venous thrombosis. 16 patients were reexamined after a 5-year follow-up. At follow-up, the patency of venous segments as well as the development of reflux was investigated by duplex-ultrasound. Furthermore, clinical signs and symptoms of PTS in patients were recorded.

**Results:** Clinical pulmonary emboli did not occur in the perioperative period. Two patients died because of disseminated metastatic cancer and another after massive retroperitoneal bleeding due to anticoagulation therapy. In a 5-year follow up, 31% had valvular reflux. Venous patency rate was 75%. The rate of PTS was 37.5% without the severe form of PTS. Patients did not have healed, healing, and/or active venous ulcer.

**Conclusion:** It is thought that vein patency and valvular function were relatively restored, and PTS was prevented after surgical thrombectomy. Vascular surgeons should include venous thrombectomy as a part of their routine operative armamentarium, offering this procedure to patients with iliofemoral DVT, especially if other options are not available or have failed.

**Keywords:** DVT, iliofemoral thrombosis, venous thrombectomy, PTS, valvular reflux, vein patency.

### Introduction

Deep vein thrombosis (DVT) is a common and costly medical problem with serious morbid complications such as pulmonary emboli and post-thrombotic syndrome [1,2,3,4].

The goal of treatment of acute DVT has been directed toward reduction of pain and swelling of the involved leg, limiting the progression of

existing clot and preventing pulmonary emboli and recurrent thrombosis, and prevention of disabling post-thrombotic syndrome by restoration of venous patency, preserving normal functioning valves and preventing reflux [4,5,7,9,14,15,16,17,18,24,27].

PTS is the most important late sequel of DVT that develops as a results of persistent venous obstruction, incompetent venous valves, or both [4,5,7,9,14,15,16,17,18,19,24,27]. The

1. **Corresponding author**, Associate Professor of General Surgery, Shahid Beheshti University of Medical Sciences, Shohada-e-Tajrish Medical Center, Ghods Square, Tehran, Iran. Tel: 9821 22719013, email: mohamad\_mozafar@yahoo.com.

2. Resident of Vascular and Trauma Surgery, Shahid Beheshti University of Medical Sciences and Health Services, Shohada-e-Tajrish Hospital, Tehran, Iran.

overall outcome of DVT, in terms of disturbed venous physiology, depends to a great extent on the location of the thrombosed segments and the extent of involvement [10,21]. Studies have shown that DVT of the distal calf veins has a low occurrence of PTS compared to iliofemoral vein thrombosis [3,6,17,21]. Treatment options for acute iliofemoral vein thrombosis have expanded in recent years and now include systemic anticoagulation therapy, systemic thrombolytic therapy, catheter directed thrombolytic therapy, and surgical thrombectomy [16,17,18,20]. Yet, today we are still faced with the dilemma of which treatment will provide the best acute management, has minimal risks and prevents long term sequelae more effectively as evidenced by PTS [6,8,13]. Unfortunately, current published guidelines do not recommend venous thrombectomy. Rather, they recommend against its use because of the poor results initially reported [2,3,6]. However, now in regard to better surgical technique and patient selection, surgical thrombectomy has had a significant role in treatment of these patients [2,3,6,13,17,24,27]. The aim of this study was to evaluate the long term outcome of surgical thrombectomy, including valvular reflux, recanalization of veins and PTS in patients with acute iliofemoral vein thrombosis.

### Methods

This retrospective study was conducted on 18 patients diagnosed with iliofemoral DVT between 2000 and 2003 who were treated with surgical thrombectomy. Patients' records were obtained from the Vascular Ward of Shohada-e-Tajrish Hospital. Diagnosis of DVT was confirmed through review of color-flow duplex scans performed by an experienced radiologist. Diagnosis of DVT was made on the basis of the finding of all four criteria: 1) non-compressibility of the vein, 2) dilatation of the vein, 3) lack of a Doppler signal, and 4) lack of visible flow. Only those patients who were found to have iliofemoral DVT, defined as

any deep vein clot involving the iliac veins or lower, were chosen for this study. Patients were treated with transfemoral thrombectomy followed by arteriovenous fistula (greater saphenous vein to superficial femoral artery), intravenous unfractionated heparin and oral warfarin with an International Normalized Ratio level of 2-3. All patients in the perioperative period were frequently reexamined for signs and symptoms of bleeding, pulmonary emboli, recurrence of DVT, and other complications. After a 5-year follow up, 16 patients were reexamined. Incidence of venous recanalization, development of reflux, and PTS were recorded.

Development of recanalization, defined as any resolution or lysis of the clot involving the deep veins, and valvular reflux of patients were studied by review of color-flow duplex scans. We defined significant reflux as retrograde flow that lasted more than 0.5 seconds in the deep veins. Signs and symptoms of PTS included pain, swelling, skin hyperpigmentation, venous claudication, and ulcer.

### Results

Eighteen patients with acute iliofemoral vein thrombosis were treated with surgical thrombectomy.

Clinical characteristics are shown in Table 1. Predisposing risk factors for DVT in these patients are shown in Table 2. Three patients (16.5%) had more than one risk factor. The mean time of hospital stay was 10 days (range: 6-13 days). Perioperatively, two patients (11%) died; one had extensive metastatic cancer and the other died after massive retroperitoneal hemorrhage due to anticoagulation therapy. In the perioperative period, clinical pulmonary emboli did not occur. The only early complication was surgical site infection that occurred in one (5.5%) patient. On follow up 16 patients were reexamined after 5-years. Two patients (11%) had recurrence of DVT; symptoms in acute phase were milder compared to the first episode of DVT. The rate of recanalization in

| Characteristic               | N.(%)      |
|------------------------------|------------|
| -Number of patients          | 18 (100%)  |
| -Sex                         |            |
| Male                         | 4 (22%)    |
| Female                       | 14 (78%)   |
| -Site of DVT                 |            |
| Right                        | 1 (2.5%)   |
| Left                         | 17 (94.5%) |
| -Age (year)                  |            |
| Mean                         | 51         |
| Range                        | 18-75      |
| -Past history of DVT         |            |
| Negative                     | 18 (100%)  |
| Positive                     | 0          |
| -Initiation of symptoms(day) |            |
| Mean                         | 3          |
| Range                        | 1-5        |

Table 1. Clinical characteristic of patients with iliofemoral DVT.

common iliac, external iliac, common femoral, superficial femoral, popliteal, and calf veins on duplex scan were 100%, 75%, 81%, 81%, 87.5%, and 100%, respectively. 5 patients (31%) developed reflux in at least one deep venous segment over a 5-year follow up. The signs and symptoms of PTS were found in 6 patients (37.5%); 10 patients (62.5%) were asymptomatic in a 5-year follow up. Healing or active venous ulcers were not seen in patients with PTS.

### Discussion

Some studies have shown that patients with iliofemoral DVT have higher rates of PTS [3,6,17,21]. However, many studies have shown that early relief of obstructing thrombus by thrombolysis or thrombectomy could pre-

vent more extensive PTS [1,2,3,6,17,42]. The underlying pathophysiology of PTS is ambulatory venous hypertension that develops as a result of persistent venous obstruction, incompetent venous valves or both [4,5,7,9,14,15,16,17,18]. Akesson and coworkers showed that in a 5-year follow up of patients with DVT that were treated with anticoagulation alone, the rate of ambulatory venous hypertension was 95% and 90% of patients had signs and symptoms of chronic vein insufficiency [30]. Results of our study in prevention of valvular reflux and PTS, and restoration of venous patency rate are relatively similar to the previous study [11,13,22,26,28,29] and when compared to studies [22,23,25,29,30] with systemic anticoagulation therapy alone, it is a relatively effective and successful treatment approach. Investigators recommend this aggressive approach with rapid removal of the occluding thrombus in the leg veins extending up into the iliac veins in active patients with a short history of symptomatic DVT, usually less than 7 days [3,12,20,24,27]. This approach is not justified in chronically ill, bedridden, high risk or aged patients, or those with serious intercurrent disease or limited life expectancy [3,12,20,24,27]. In these patients, such interventions can only be indicated for limb salvage in phlegmasia cerulea dolens when conservative treatment does not prevent the development of an acute compartment syndrome with venous gangrene [3,12,20,24,27]. In regard to the relatively beneficial effect of this approach, vascular surgeons should consider venous thrombectomy as a part of their routine operative procedure, offering it to patients with iliofemoral DVT, especially if other options are not available or have failed. However, it is required that the investigators confirm the better effect of surgical thrombectomy as compared to anticoagulation therapy alone in patients with acute iliofemoral DVT in a prospective randomized clinical trial.

| Risk factor            | N.(%)     |
|------------------------|-----------|
| Hormonal therapy (OCP) | 5 (27.5%) |
| Postoperative          | 4 (22%)   |
| Smoking                | 4 (22%)   |
| Trauma                 | 2 (11%)   |
| Malignancy             | 1 (5.5%)  |
| Thrombophilia          | 2 (11%)   |
| Idiopathic             | 4 (22%)   |

Table 2. Clinical risk factors in patients with iliofemoral DVT.

## References

1. Comerota AJ, et al. Treatment of acute iliofemoral deep venous thrombosis: a strategy of thrombus removal. *Eur J Vasc Endovasc Surg* 2007; 33:351-360.
2. Anthony J, et al. Technique of contemporary iliofemoral and infrainguinal venous thrombectomy. *J Vasc Surg* 2006; 43:185-91.
3. Menreal M, et al. Deep vein thrombosis and pulmonary embolism: the same disease. *Pathophysiol Haemost Thromb* 2006; 35(1-2):133-5.
4. Kahn SR. Frequency and determinants of the post-thrombotic syndrome after venous thrombo-embolism. *Curr Opin Pulm Med* 2006 Sep; 12(5):299-303.
4. Meissner MH, et al. Secondary chronic venous disorders. *J Vasc Surg* 2007 Dec; 46 Suppl S: 68S-83S.
5. Comerota AJ, et al. Iliofemoral venous thrombosis. *J Vasc Surg* 2007 Nov; 46(5):1065-76.
6. Markel A. Origin and natural history of deep vein thrombosis of the legs. *Semin Vasc Med* 2005 Feb; 5(1): 65-74.
7. Agnelli G. Current issues in anticoagulation. *Pathophysiol Haemost Thromb* 2005; 34(1): 2-9.
8. Singh H, et al. Comparing short-term outcomes of femoral-popliteal and iliofemoral deep venous thrombosis: early lysis and development of reflux. *Ann Vasc Surg* 2005 Jan; 19(1):74-9.
9. Yamaki T, et al. Patterns of venous insufficiency after an acute deep vein thrombosis. *J Am Coll Surg* 2005 Aug; 201(2): 231-8.
10. Schwarzbach MH, et al. Surgical thrombectomy followed by intraoperative endovascular reconstruction for symptomatic iliofemoral venous thrombosis. *Eur J Vasc Endovasc Surg* 2005 Jan; 29(1):58-66.
11. Eklof B, et al. Surgical thrombectomy for acute deep vein thrombosis. In: Rutherford RB, editors. *Vascular Surgery*. 6th ed. Philadelphia: Elsevier-Saunders; 2005. pp.2188-2198.
12. Kamphausen M, et al. Clinical and functional results after transfemoral thrombectomy for iliofemoral deep venous thrombosis: a 5-year follow-up. *Zentralbl Chir* 2005 Oct; 130(5):454-61.
13. Lopez-Azkarreta I, et al. Prospective study of the risk factors for the development of post-thrombotic syndrome after proximal deep venous thrombosis. *Med Clin (Basc)* 2005 Jun 4; 125(1):1-4.
14. Sillesen H, et al. Catheter directed thrombolysis for treatment of iliofemoral deep venous thrombosis is durable, preserves venous valve function and may prevent chronic venous insufficiency. *Eur J Vasc Endovasc Surg* 2005 Nov; 30(5):556-62.
15. Bulger CM, et al. Epidemiology of acute deep vein thrombosis. *Tech Vasc Interv Radiol* 2004 Jun; 7(2):50-4.
16. Augustinos P, et al. Invasive approaches to treatment of venous thromboembolism. *Circulation* 2004 Aug 31; 110(9 suppl 1): I27-34.
17. Murphy KD. Mechanical thrombectomy for DVT. *Tech Vasc Interv Radiol* 2004 Jun; 7(2): 79-85.
18. Cosmi B, et al. Oral anticoagulant therapy in venous thrombo-embolism. *Semin Vasc Med* 2003 Aug; 3(3): 303-14.
19. Largaier J, et al. Therapeutic concept for acute leg and pelvic venous thrombosis. *Acta Chir Belg* 2002 Oct; 102(5): 356-61.
20. Douketis JD, et al. Does the location of thrombosis determine the risk of disease recurrence in patients with proximal deep vein thrombosis. *Am J Med* 2001 May; 110(7):515-9.
21. Abu-Rahman AF, et al. Iliofemoral deep vein thrombosis: conventional therapy versus lysis and percutaneous transluminal angioplasty and stenting. *Ann Surg* 2001; 233:752-760.
22. Ziegler S, et al. Post thrombotic syndrome after event of deep venous thrombosis 10 to 20 years ago. *Thromb Res* 2001; 15(101): 23-33.
23. Eklof B, et al. Indications for surgical treatment of iliofemoral vein thrombosis. *Hematol Oncol Clin North Am* 2000 Apr; 14(2):471-82.
24. Saracen J, et al. The occurrence of the post thrombotic changes after an acute deep venous thrombosis. A prospective Two-year follow up study. *Ann Vasc Surg* 1999; 13:436-8.
25. Eklof B, et al. Is there a role for thrombectomy in iliofemoral venous thrombosis? *Semin Vasc Surg* 1996 Mar; 9(1):34-45.
26. Kniemeyer HW, et al. Surgical treatment of deep venous thrombosis-indications, possibilities and limitations in venous thrombectomy. *Ther Umsch* 1996 Apr; 53(4):277-83.
27. Prager M, et al. Surgical therapy of acute thrombosis of leg-pelvic veins. *Acta Med Austriaca* 1994; 21(4):102-4.
28. Plate G, et al. Long term results of venous thrombectomy combined with a temporary arterio-venous fistula. *Eur J Vasc Endovasc Surg* 1990; 4:483-9.
29. Akesson H, et al. Venous function assessed during a 5-year period after acute iliofemoral venous thrombosis treated with anticoagulation. *Eur J Vasc Surg* 1990; 4:43-48.