AGGRESSIVE THERAPIES

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Aggressive Therapies

Goals of Therapy for Venous Thromboembolism (VTE)

1. Prevent Extension or Recurrence of Deep Venous Thrombosis (DVT)
2. Prevent Pulmonary Embolism (PE)
3. Minimize Early and Late Squeal of the Thrombosis

Anticoagulants Accomplish #1, #2

Anticoagulants in General do not Accomplish #3

Aggressive Therapies

Thrombi are Dynamic

Organize, Fibrose, Recanalize, Embolize; Stimulate

Inflammatory Response in the Vein Wall and Valve

Approximately Half will Completely Recanalize within 6 to 9 months

Symptomatic Recurrent Thromboembolic Events in 5% to 15%

Occult Events even more Prominent (up to 50%)

Thrombus Propagation in 26% to 38% by Serial Ultrasound scans

Krupski et al, J Vasc Surg 125:467-475, 1990; Caps et al, Vasc Med 4:9-14, 1999;
Meissner et al, J Vasc Surg 22:558-567, 1995

Post-Thrombotic Syndrome (CVI)

Varicose Veins to Severe Pain, Swelling, and Ulceration

23% after 2 years

28% after 5 years

29% after 8 years

Especially with Ipsilateral Recurrent DVT

Prandoni et al, Ann Intern Med; 125:1-7, 1996

Aggressive Therapies

Thrombus Removal by:

Thrombolytic Medication

Mechanical Devices

Pharmacomechanical Approaches

Operative Thrombectomy

“Thrombolytic therapy remains controversial particularly due to the risk of bleeding and is not indicated for the routine treatment of VTE”

Russell Hull, PVS-V, adpated from Hirsh J, et al., Seventh ACCP Conference on Antithrombotic Therapy and Thrombolytic Therapy. Chest 126: 172S, 2004

Thrombectomy (n31) vs Anticoagulation (n32)
Clinical Success - 6 months
40% vs 7% Asymptomatic
76% vs 35% Iliofemoral Patency
52% vs 26% Femoropopliteal Patency

Thrombectomy (n13) vs Anticoagulation (n17)
Follow-up - 10 years
83% vs 41% Patency
78% vs 43% No Popliteal Reflux

Plate et al, Eur J Vasc Endovasc Surg 14:367-374, 1997
Eklof & Kistner, Sem in Vasc Surg 9:34-45, 1996

Thrombolysis with Catheter -Directed Urokinase

	Bjarnason, et al (n = 77)	Mewissen, et al (n = 287)	Comerota, et al (n = 58)
Initial Success	79%	83%	84%
Iliac	63%	64%	78%
Femoral	40%	47%	----
Primary Patency at 1 yr			
Iliac	63%	64%	78%
Femoral	40%	47%	----
Iliac Stent: Patency at 1 yr			
+Stent	54%	74%	89%
-Stent	75%	53%	71%
Complications			
Major Bleed	5%	11%	9%
Intracranial Bleeding	0%	< 1%	0%
PE	1%	1%	0%
Fatal PE	0%	0.2%	0%
Death due to lysis	0%	0.4%	0% (? 2%)*

*Death due to multiorgan system failure 30 -days post lysis, thought not related to lytic th erapy

Comerota AJ, PVS-V, 2005

Quality of Life Measures

Mean scale scores comparing patients who had either partial or complete lysis with lytic therapy vs. patients who had heparin treatment

Scale item*	Complete + partial (mean ± SE)	Heparin (mean ± SE)	*P* value
Initial contact mean, 16 months	N = 43	N = 30	
Health Utilities Index	0.83 ± 0.03	0.74 ± 0.03	.032
Role functioning physical	75.68 ± 4.57	56.59 ± 5.56	.013
Stigma	85.98 ± 4.11	71.32 ± 5.00	.033
Health distress	82.48 ± 4.04	64.11 ± 4.91	.007
Overall symptoms	78.55 ± 3.44	55.56 ± 4.19	.001
Follow-up 22 months	N = 32	N = 13	
Stigma	90.48 ± 4.11	69.50 ± 6.71	.014
Health distress	80.25 ± 4.19	56.32 ± 6.85	.006
Overall symptoms	74.11 ± 3.87	50.56 ± 6.66	.006

Comerota et al, J Vasc Surg 32: 130-137, 2000

Need Level 1 Evidence Comparing Standard Anticoagulation to Thrombus Dissolution using Thrombolysis and/or Venous Thrombectomy

We know all DVTs are Not Alike!!!

Mechanical Devices

Catheters (Venturi Effect)

Mechanical Catheters with Balloons

Early Removal of Thrombus Conveys Significant Benefits

The Earlier the Removal, the Better the Outcome

However, the Therapy is Complicated with Bleeding risk and the Value of such Therapy is Not Defined

National Organizations have Identified the Need for Studies

Society for Interventional Radiology

American Venous Forum

Pulmonary Embolism

Thrombolytic Therapy/Embolectomy for Cardiogenic Shock

? Right Ventricular Dysfunction without Hemodynamic Instability

Thrombolytics + Anticoagulants vs. Anticoagulants for Submassive PE

Thrombolytics Reduced Need to Escalate Therapy

Goldhaber SZ, Lancet 363: 1295-1305, 2004
Konstantinides S et al, N Eng J Med 347:1143-1150, 2002

Pulmonary Embolectomy

Useful in Situations of Massive PE with Thrombolysis Failure (approx 8%)

Lowers Mortality Rate ($p = 0.07$)
Lowers Recurrent PE rate ($p<.05$)
Lowers Fatal Bleeding Episodes

Meneveau N et al, Chest 129:1043-1050, 2006
Davidson B & Karny-Jones R, Chest 129:839-840, 2006

IVC Filters

Indications

Complication of Anticoagulation

Contraindication to Anticoagulation

Failure of Anticoagulation

VTE Prophylaxis

Protection from PE >95% when using wire-based filters over 20 yrs

Filters Placed Infrarenal, Suprarenal, even in SVC

Retrievable Filters (3 Types) Now Becoming Predominant

If Left to become Permanent, Long-term Fate Unknown

Percutaneous Technique

Fluoroscopy, Ultrasound (External, IVUS)

Greenfield & Proctor, Cardiovasc Surg 3:199-205, 1995

Passman MA, PVS-V, 2005

Ambulation/Stockings

Rate and Severity of Postthrombotic Syndrome after Proximal DVT can be decreased by 50% by the use of Compression Stockings

Brandjes DP et al, Lancet 349:759-762, 1997
Prandoni P et al, Pathophysiol Haemost Thromb 32:72, 2002

Walking with Good Compression does not Increase the Risk of PE, while significantly Decreasing the Incidence and Severity of the Postthrombotic Syndrome

Schellong SM et al, Thromb Haemost 82(Suppl 1):127-129, 1999
Aschwanden M et al, Thromb Haemost 85:42-46, 2001
Partsch H et al, Sem Vasc Surg 18:148-152, 2005

So, Once Patient Anticoagulated, Recommend Ambulation with Support, either Stockings or Wrappings

Thank You