XV. ULUSAL VASKÜLER CERRAHİ KONGRESİ
European Society for Vascular Surgery
ULUSAL VASKÜLER CERRAHİ DERNEĞİ 1982
esvs & UVCD işbirliği ile
27-30 Ekim 2011
Rixos Sungate Otel Kemer / ANTALYA

Contemporary Management of Iliofemoral Venous Thrombosis

Anthony J. Comerota, MD, FACS, FACC

Director,
Jobst Vascular Institute

Adjunct Professor of Surgery,
University of Michigan

JOBST
VASCULAR INSTITUTE

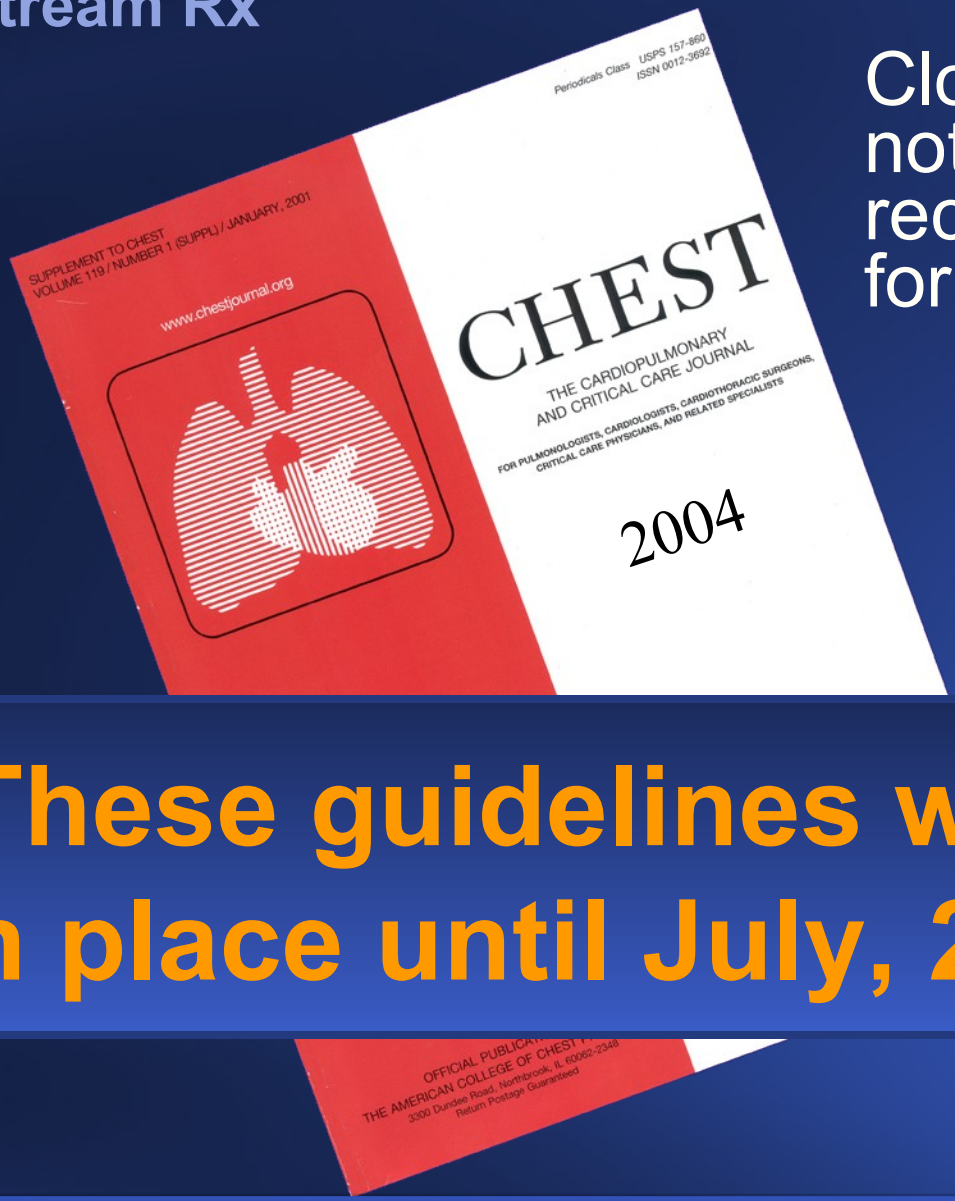
PROMEDICA

Case from Tuesday

- 22yo. woman, referred from outside hospital
- 3X Ohio State Champion
  400 meter dash
  800 meter run
- Track scholarship to the Ohio State University
- Iliofemoral DVT after BCP in 2007
- Treated with anticoagulation
- Venous claudication/painful left leg
  …lost scholarship
  …no longer in college

Acute Venous Thromboembolism

Mainstream Rx



Clot removal was not a part of recommendation for care

These guidelines were in place until July, 2008

Initial Question…

Which acute DVT patients benefit from a strategy of thrombus removal?

ANSWER: Probably all, but iliofemoral DVT for sure!

Why iliofemoral DVT patients?

Why Iliofemoral DVT Patients?

- Single venous outflow channel occluded
- Most severe postthrombotic morbidity when treated with anticoagulation alone
- Significant increased risk of recurrence

Iliofemoral DVT

Acute Post Op

Iliofemoral DVT

Venous Thrombectomy

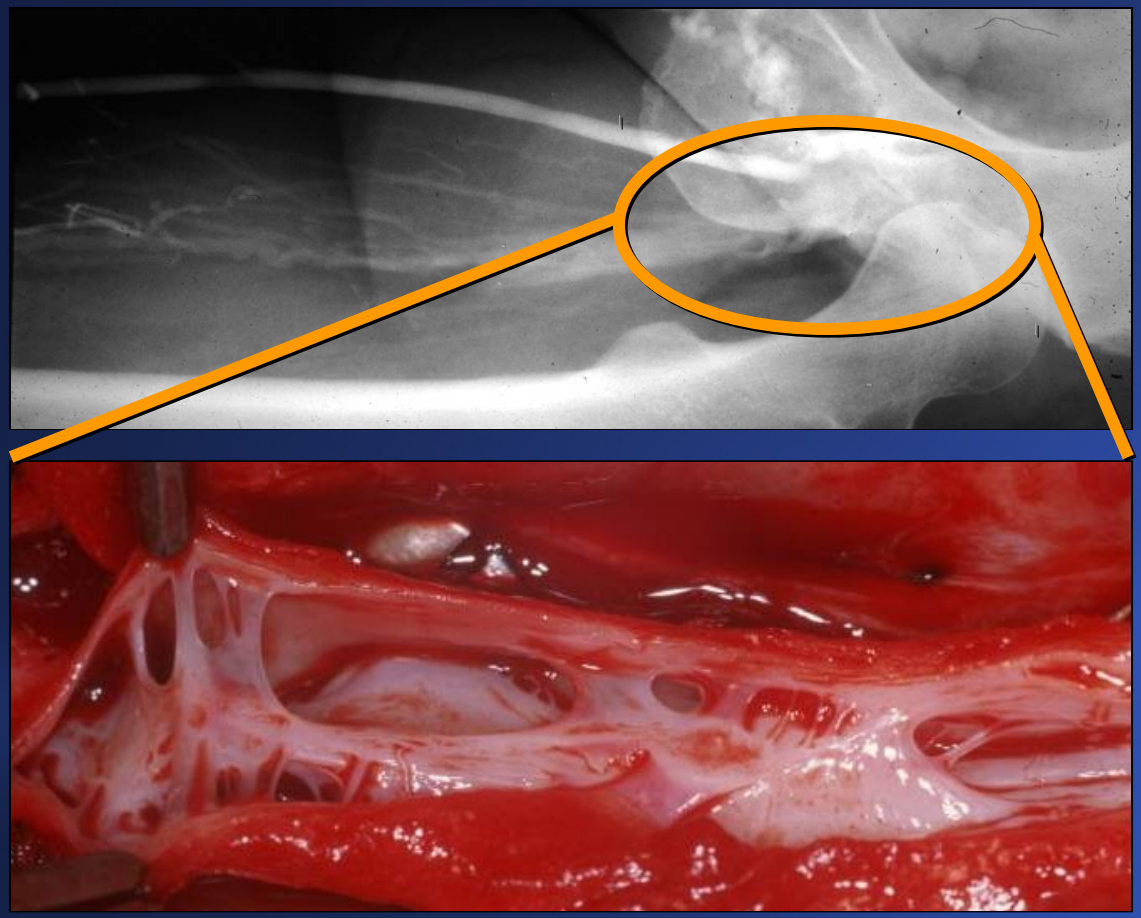
Iliofemoral DVT

Post-Thrombotic Syndrome

Anticoagulation Alone

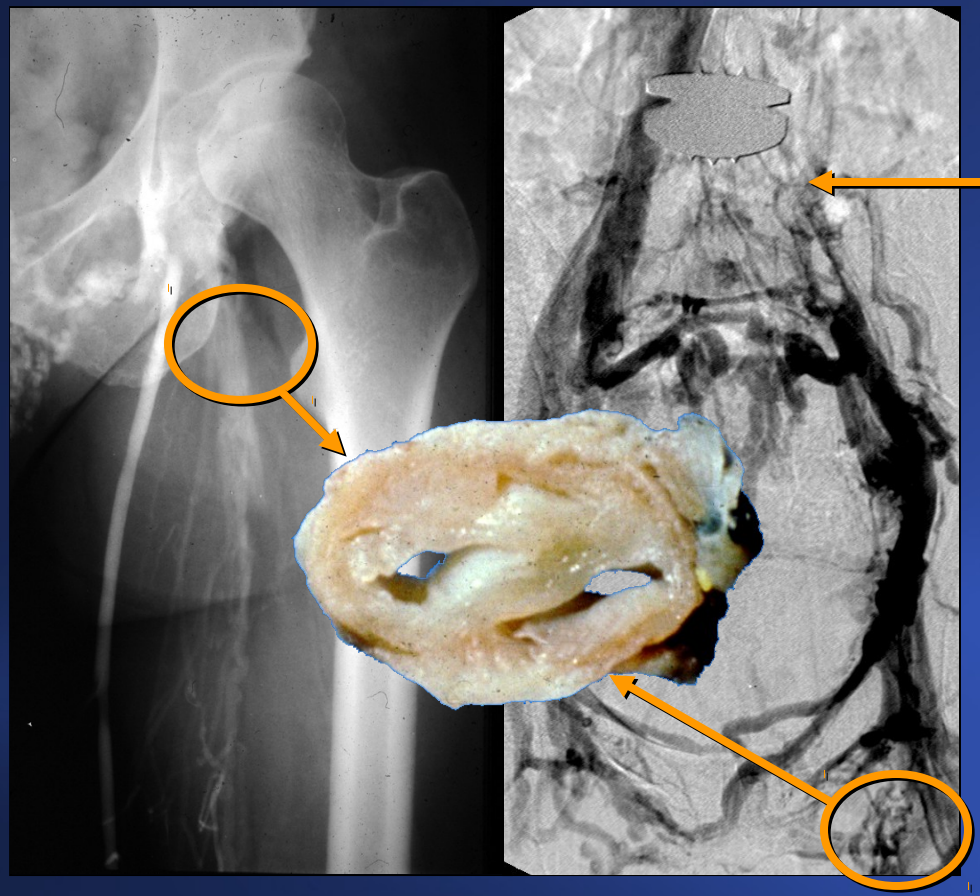
Anticoagulation Alone

Phlebographic and Pathologic Outcome



Anticoagulation Alone

Long-term Outcome



Anticoagulation Alone

Clinical Outcome

- Actual Photo -

C-6

- Ulceration
- On Disability
- Poor QOL

…or…

Iliofemoral DVT

3 Years Post Thrombus Removal

- Actual Photo -

- Hairdresser
- No edema
- Asymptomatic Normal valve function

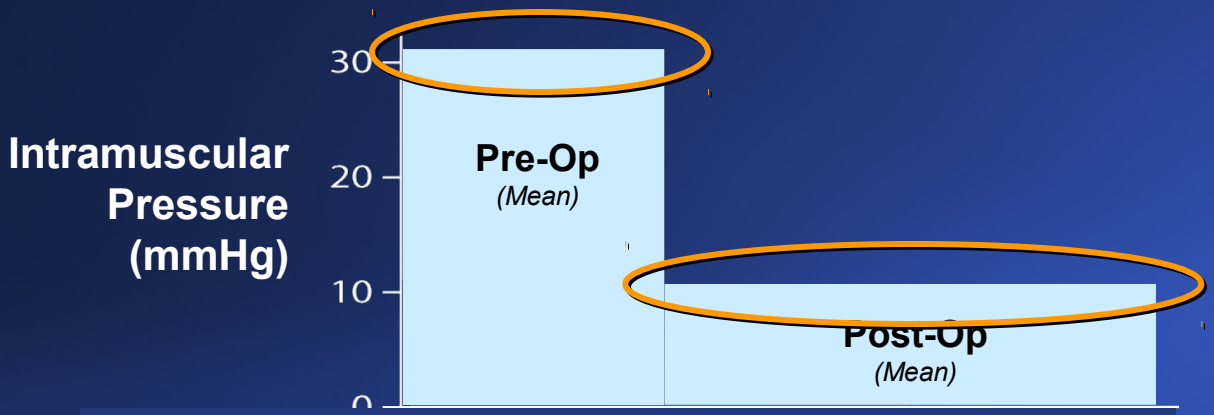
Actual outcome Post-Thrombectomy

Iliofemoral DVT

Intramuscular Pressures (mmHg)

- 12 Patients with iliofemoral DVT
- Venous thrombectomy
- Intramuscular pressures (wick)
  (Surrogate for venous pressure)

Anterior & Deep Posterior Compartments (Mean)



Reduction of pressure to normal after thrombus removal

Qvarfordt P et al
Ann Surg 1983;197:450

Strategy of Thrombus Removal

Pathophysiology

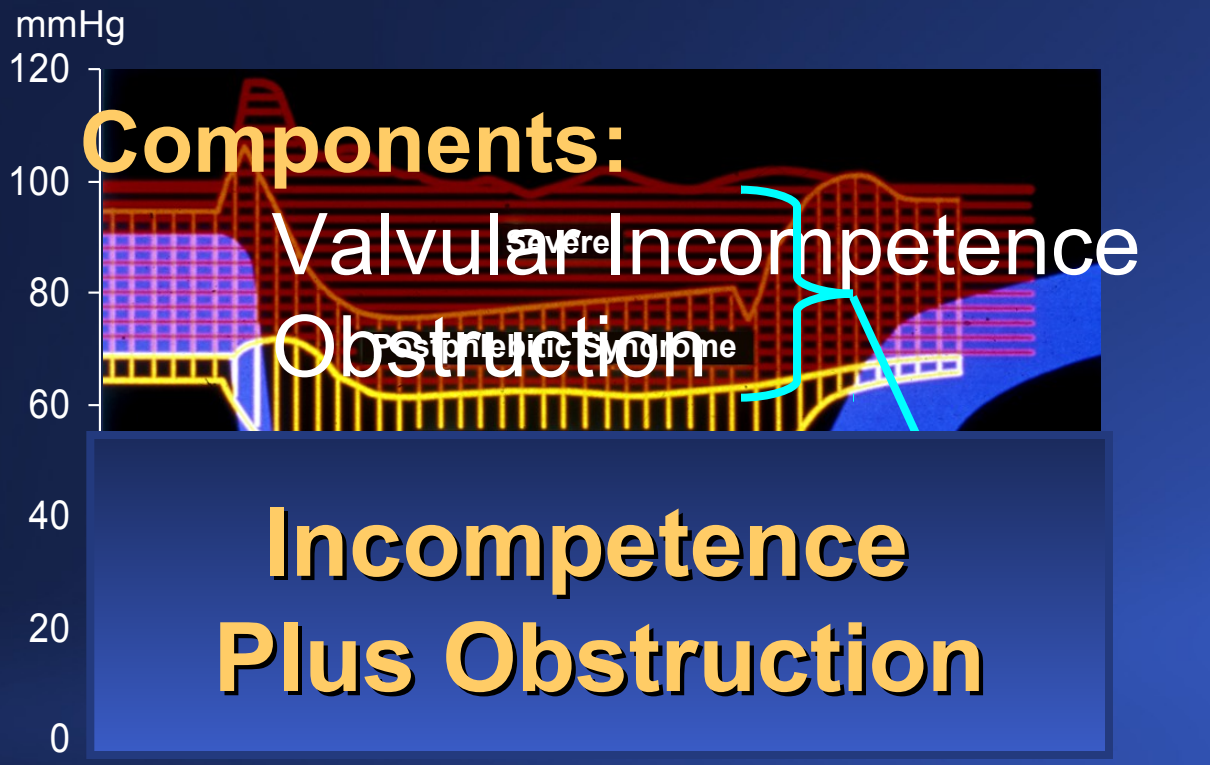
Ambulatory venous hypertension is ***THE*** underlying pathophysiology of chronic venous disease/PTS

How can we expect post-thrombotic venous pressures to be normal if obstructing thrombus is not removed?

Chronic Venous Insufficiency

Pathophysiology

Ambulatory Venous Hypertension



Outcomes After Anticoagulation Alone

Determinants and Time Course of the Postthrombotic Syndrome after Acute Deep Venous Thrombosis

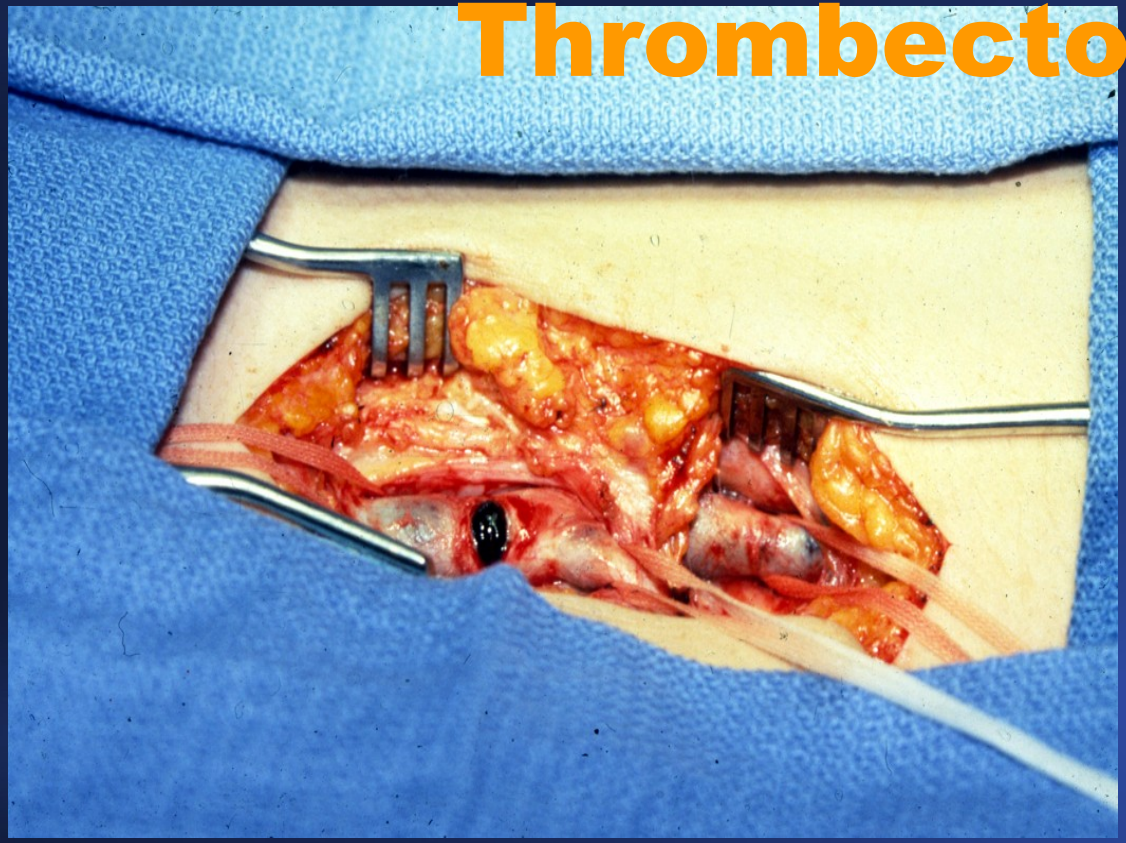
Susan R. Kahn, MD, MSc; Ian Shrier, MD, PhD; Jim A. Julian, MMath; Thierry Ducruet, MSc; Louise Arsenault, BA; Marie-José Miron, MD; Andre Roussin, MD; Sylvie Desmarais, MD; France Joyal, MD; Jeannine Kassis, MD; Susan Solymoss, MD; Louis Desjardins, MD*; Donna L. Lamping, PhD; Mira Johri, PhD; and Jeffrey S. Ginsberg, MD

Findings

- 1 month observation was best predictor of long-term outcome ($p<0.001$)
- IFDVT patients had the most severe post-thrombotic morbidity (OR 2.23; $p<0.001$)

Ann Int Med 2008; 149:698

"Contemporary" Venous Thrombectomy



Operative Venous Thrombectomy

Why Operate?

Randomized Trial: Iliofemoral DVT

Venous Thrombectomy vs. Anticoagulation

(Follow-up @ 6 mos, 5 yrs, 10 yrs)

Patients randomized to thrombectomy showed:

1. Improved patency — $P<0.05$
2. Lower venous pressures — $P<0.05$
3. Less leg swelling — $P<0.05$
4. Fewer post-thrombotic symptoms — $P<0.05$

…compared to anticoagulation

Level I Data

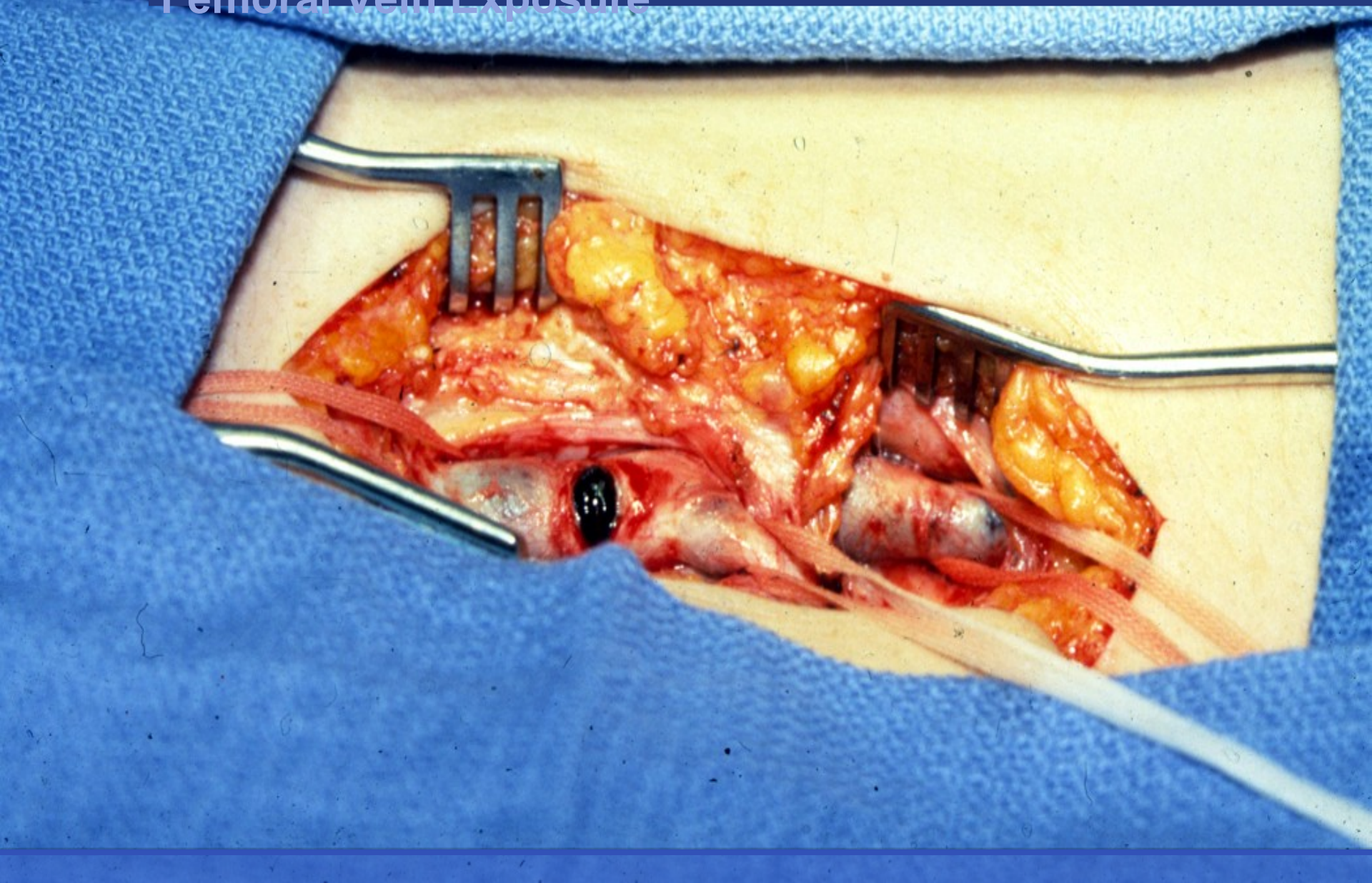
Plate G, et al. *JVS*; 1984
Plate G, et al. *Eur J Vasc Surg*; 1990
Plate G, et al. *Eur J Vas Endovasc Surg*; 1997

Iliofemoral DVT

Acute Post Op

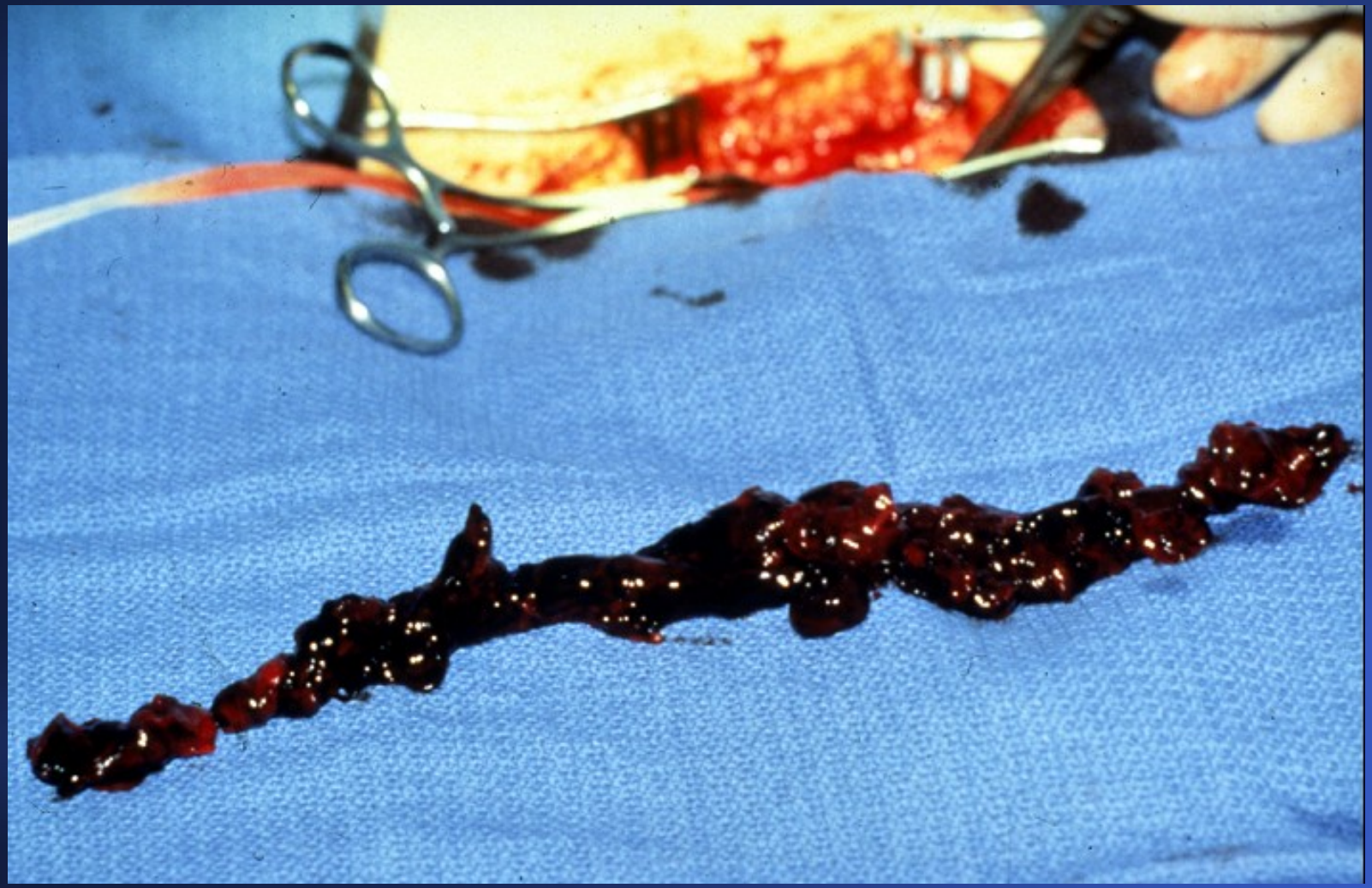
Venous Thrombectomy

Femoral Vein Exposure



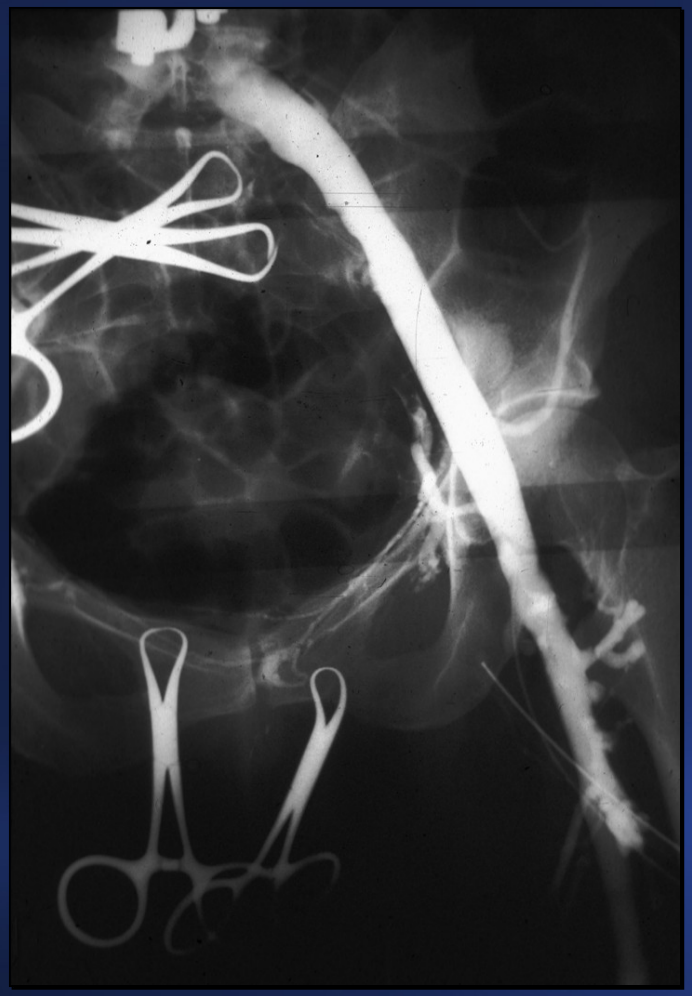
Iliofemoral DVT

Venous Thrombectomy



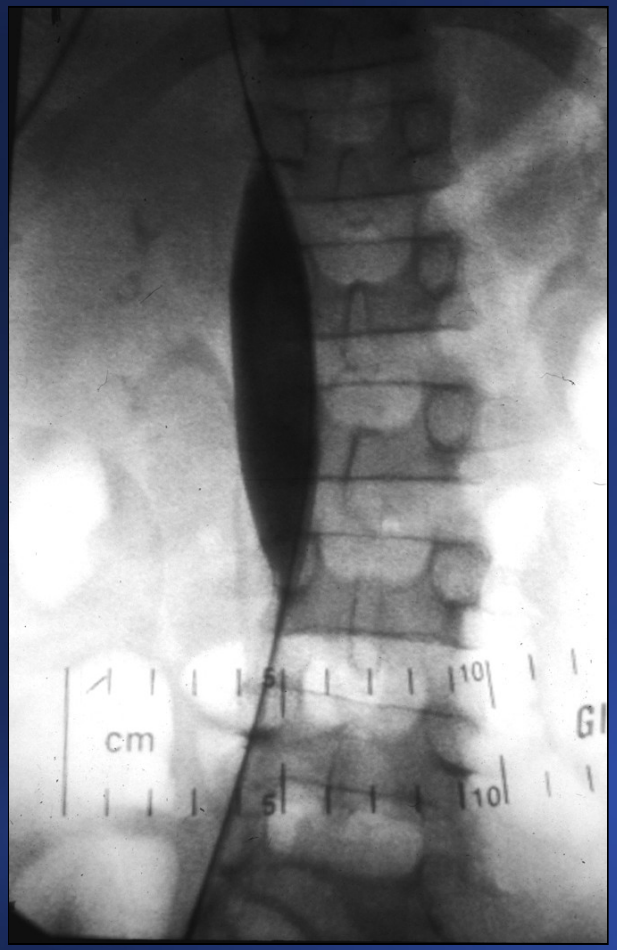
Venous Thrombectomy

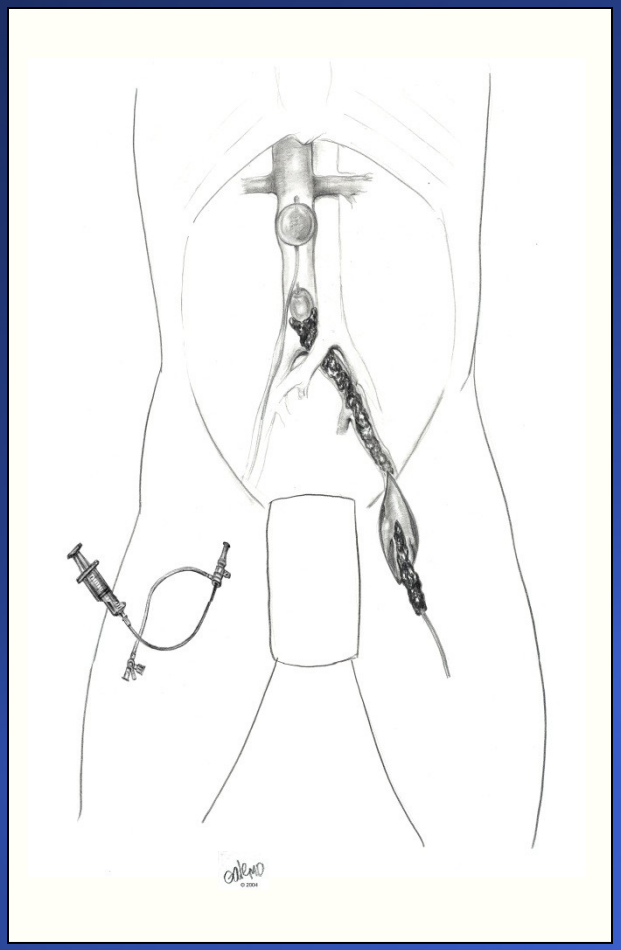
Completion Phlebogram



Venous Thrombectomy

Caval Clot





Comerota AJ, Gale S
J *Vasc Surg* 2006;43:185-91.

Venous Thrombectomy

Specimen

"Contemporary" Venous Thrombectomy

January 2006

Journal of Vascular Surgery

TECHNICAL NOTE

Technique of contemporary iliofemoral and infrainguinal venous thrombectomy

Anthony J. Comerota, MD, FACS,[a,b] and Steven S. Gale, MD, FACS,[a] *Toledo, Ohio, and Ann Arbor, Mich*

approach to patients with few alternatives to clear the venous system. Because the patient benefit is well established, vascular surgeons should include contemporary venous thrombectomy as part of their routine operative armamentarium, offering this procedure to patients with extensive deep vein thrombosis involving the iliofemoral venous system, especially if other options are not available or have failed. (J Vasc Surg 2006;43:185-91.)

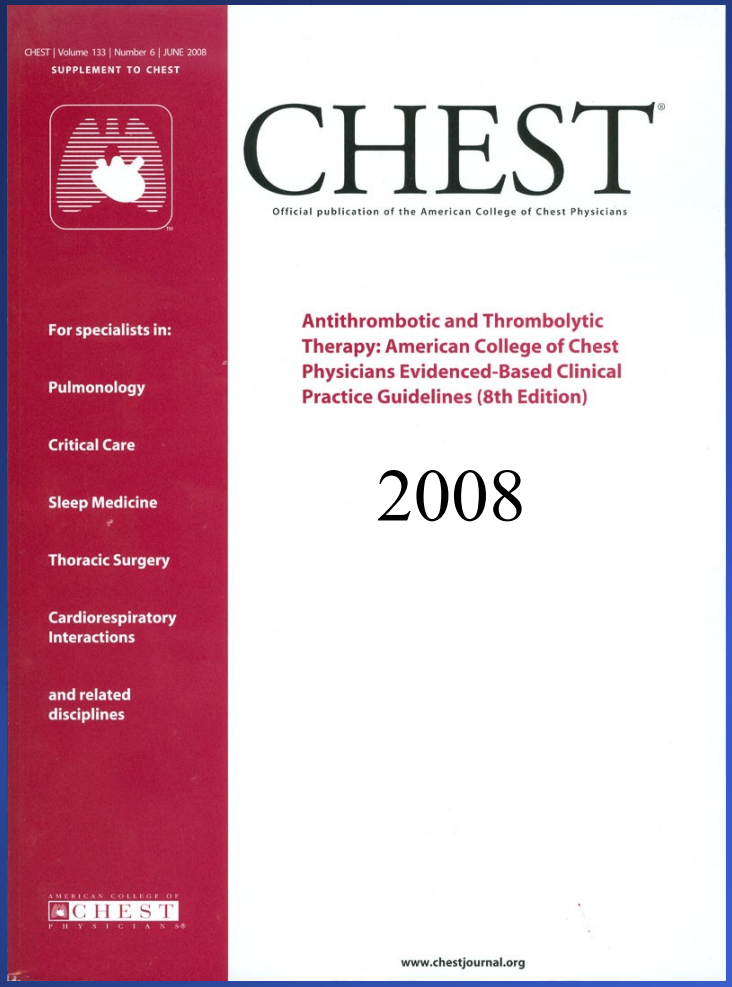
What's New in Venous Disease?

Acute DVT

Recommendations

"In […patients] with extensive DVT…***operative venous thrombectomy*** may be used to reduce acute symptoms and post-thrombotic morbidity…"

…GRADE 2B…



Catheter-Directed

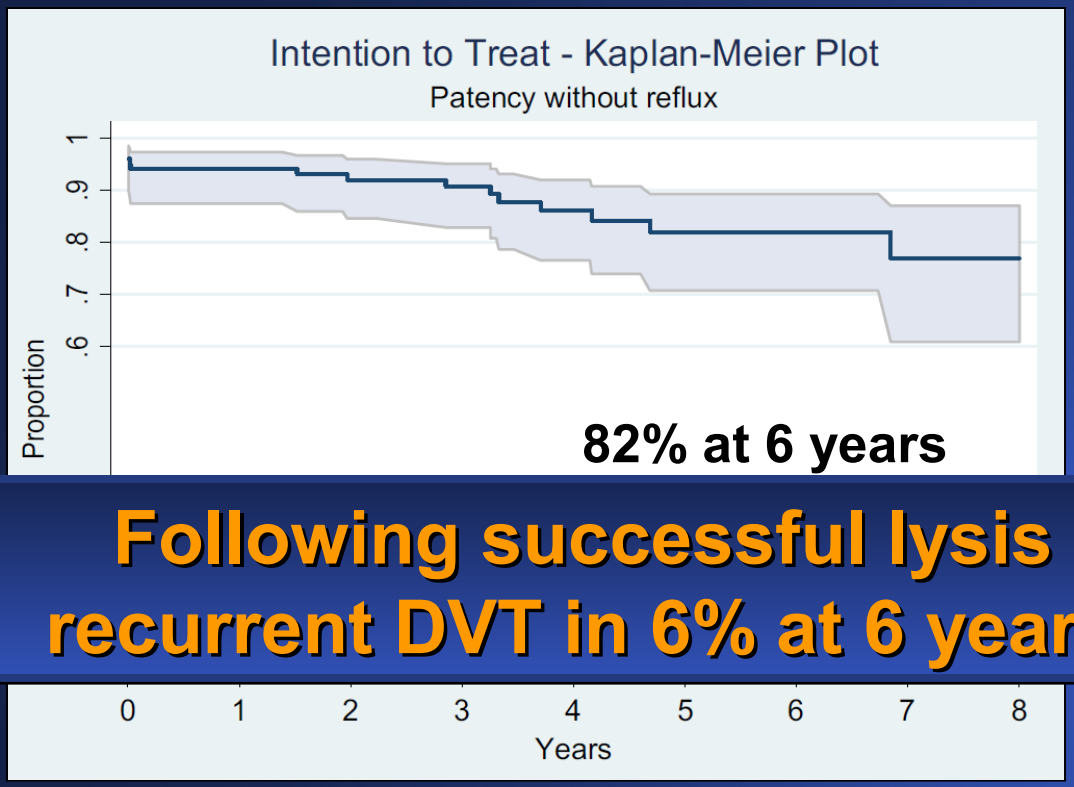
o

Catheter-Directed Thrombolysis for IFDVT

Long-Term Follow-Up (N=103)

Results

– *Patency Without Reflux* –



Following successful lysis recurrent DVT in 6% at 6 years

Baekgaard N et al
Eur J Vas Endovas Surg 2009

Strategy of Thrombus Removal: QOL

CDT vs Anticoagulation

– *Cohort Controlled Study* –

QOL Measure	CDT	No CDT	*p-value*
Health Util Index	.83	.74	*0.032*
Role Phys			*0.013*
Health Dis			*0.007*
Stigma			*0.033*
Overall Symptom	78.5	55.5	*<0.001*

- Significantly better QOL with CDT plus anticoagulation
- Lytic failures had same QOL as anticoagulation alone

Comerota AJ et al
JVS 2000;32:130-7.

Catheter-Directed Thrombolysis for IFDVT

Randomized Trials

– *Patency* –

(6 Months)

	Lysis	Anticoag	*p-value*
Elsharawy et al Eur J Vasc Endovasc Surg 2002; 24:209 ***(N=35)***	**72%**	**12%**	*<0.001*
Enden et al J Thromb Haemost 2009; 7:1268 ***(N=103)***	**64%**	**36%**	*0.004*

Catheter-Directed Thrombolysis for IFDVT

Randomized Trials

– *Normal Valve Function* –

(6 Months)

	Lysis	Anticoag	*p-value*
Elsharawy et al Eur J Vasc Endovasc Surg 2002; 24:209 ***(N=35)***	**89%**	**59%***	*0.041*
Enden et al J Thromb Haemost 2009; 7:1268 ***(N=103)***	**40%**	**34%***	*0.53*

Reflux cannot occur in occluded veins

Phlegmasia Cerulea Dolens

- 65 yo Caucasian male
- Chronic low back pain
  …worse x one month
- Phlegmasia cerulea dolens
- Venous duplex:

Clot post tib $\rightarrow$ Ext. iliac vein

Phlegmasia Cerulea Dolens

Femoral Popliteal

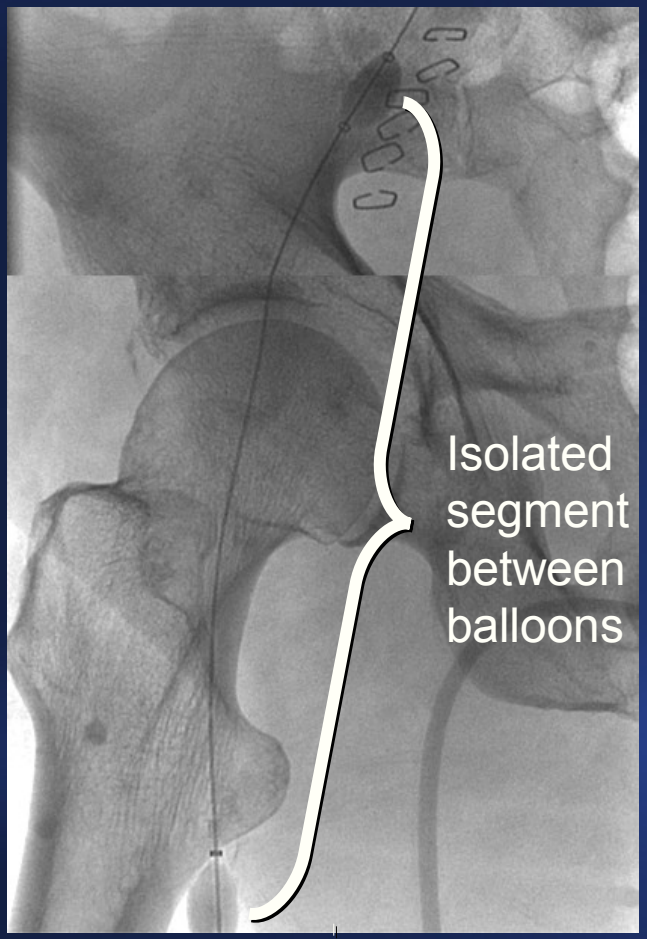
Phlegmasia Cerulea Dolens

Posterior Tibial Vein Catheter

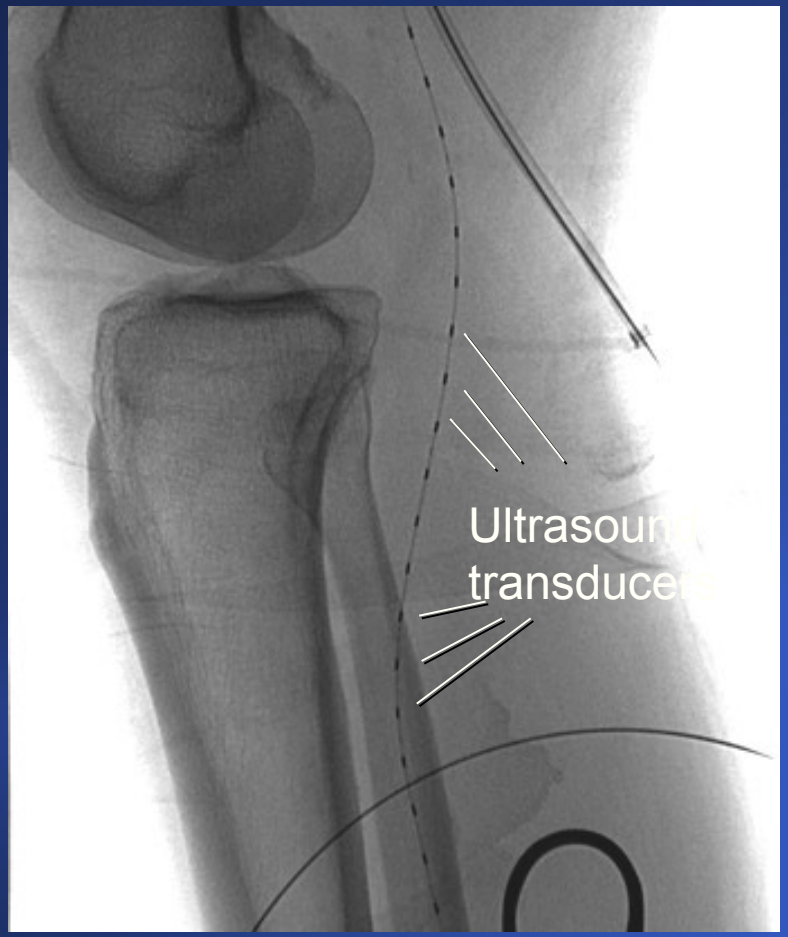
Phlegmasia Cerulea Dolens

US Guided Venous Access

Trellis catheter



Lysus catheter

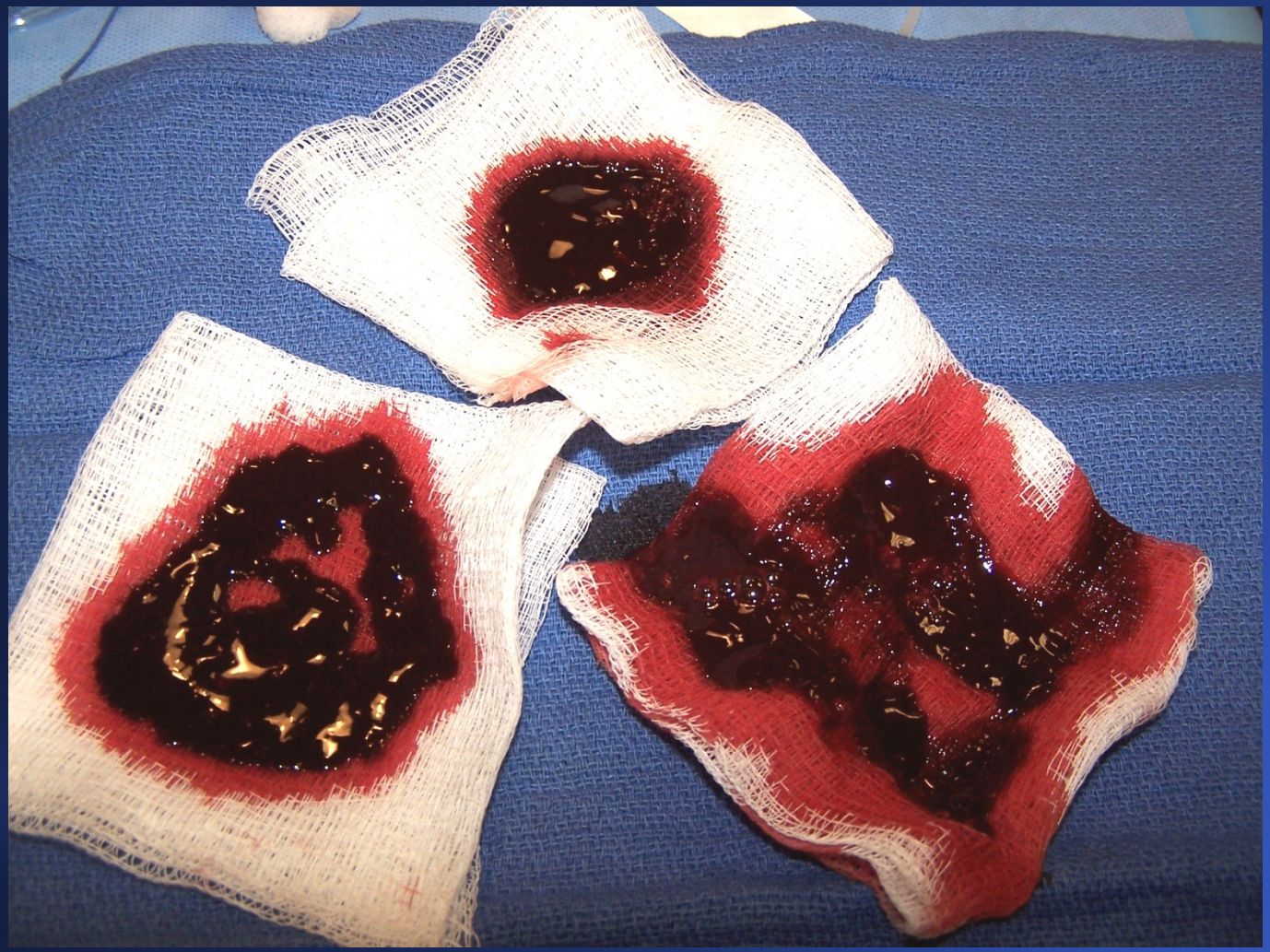


Phlegmasia Cerulea Dolens

Post Trellis®: ISPMT

Phlegmasia Cerulea Dolens

Trellis® Specimen: Aspiration via Sheath



Phlegmasia Cerulea Dolens

Post Ultrasound Lysis

Phlegmasia Cerulea Dolens

Post Trellis®, LysUS®, Angiojet® and Stent

Phlegmasia Cerulea Dolens

16 Month Follow-up

- Asymptomatic
- No PTS symptoms
- All veins patent
- Normal deep valve function

Phlegmasia Cerulea Dolens: Severe

Anticoagulation X 5 days

Phlegmasia Cerulea Dolens: Severe

Initial Phlebogram: Proximal Obstruction

Phlegmasia Cerulea Dolens: Severe

S/P Pharmacomechanical Thrombolysis

Phlegmasia Cerulea Dolens: Severe

S/P Pharmacomechanical Thrombolysis

– 12 Month Follow-Up –

- Patent veins
- *Normal valve function*
- *No edema*
- *Full activity*
- *Asymptomatic*

Strategy of Thrombus Removal: QOL

CDT vs Anticoagulation

– *Cohort Controlled Study* –

QOL Measure	CDT	No CDT	*p-value*
Health Util Index	.83	.74	*0.032*
Role Phys			*0.013*
Health Dis			*0.007*
Stigma			*0.033*
Overall Symptom	78.5	55.5	*<0.001*

- Significantly better QOL with CDT plus anticoagulation
- Lytic failures had same QOL as anticoagulation alone

Comerota AJ et al
JVS 2000;32:130-7.

Strategy of Thrombus Removal: QOL

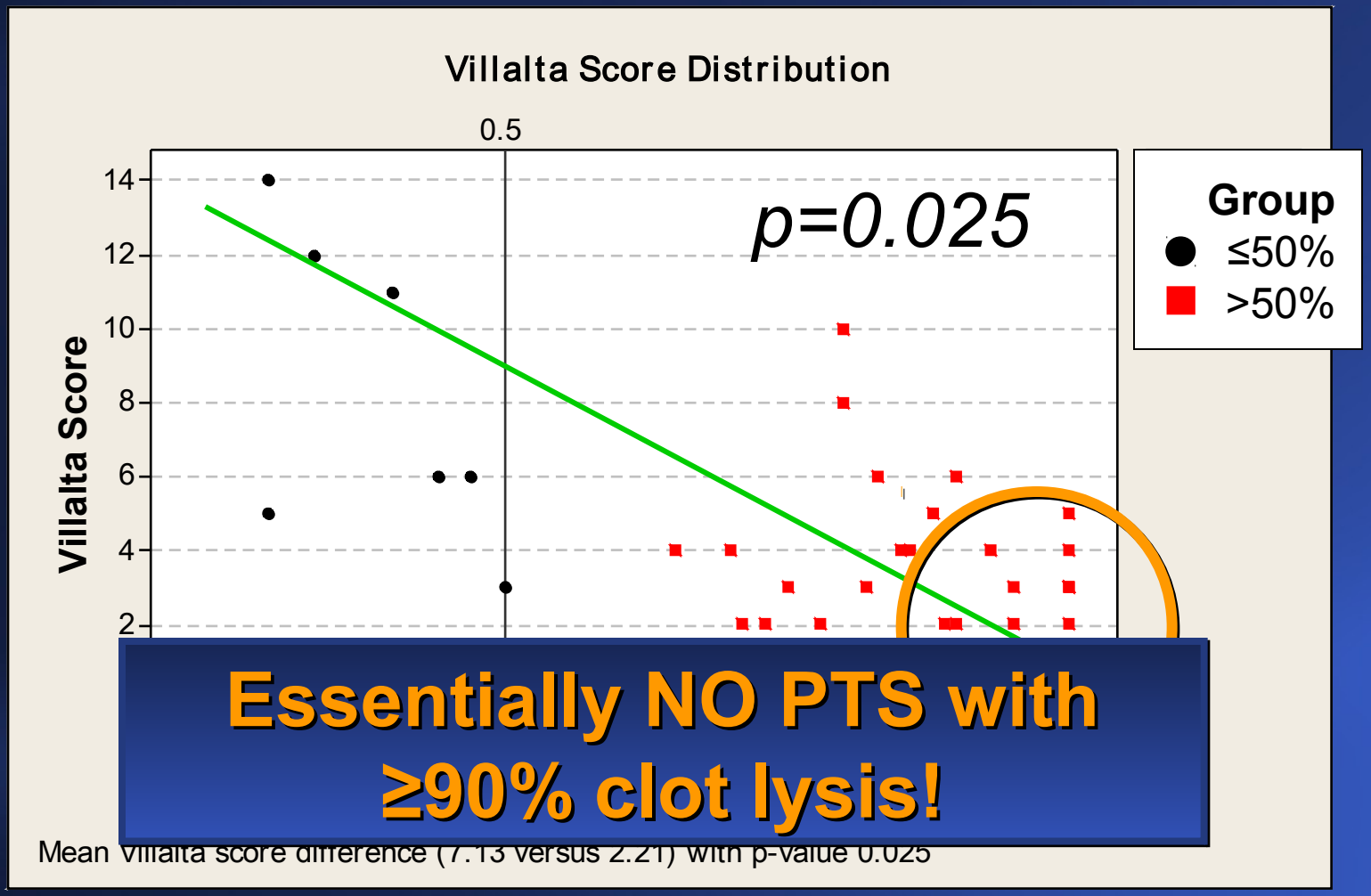
Percent Lysis vs QOL

SF-36 Measure	Group I (>50%)	Group II (<50%)	*p-value*
Physical Fct	48.1	37.3	*0.035*
Role Physical	48.5	35.8	*0.013*
General Health	49.0	39.0	*0.014*
Vitality	51.7	36.2	*<0.001*
Social Fct	49.0	38.4	*0.038*

Grewal P et al
J Vasc Surg 2010 (in press)

Outcome Measures after IFDVT Lysis

Results: Villalta Score vs Percent Lysis



Grewal P et al
Am Ven Forum 2010

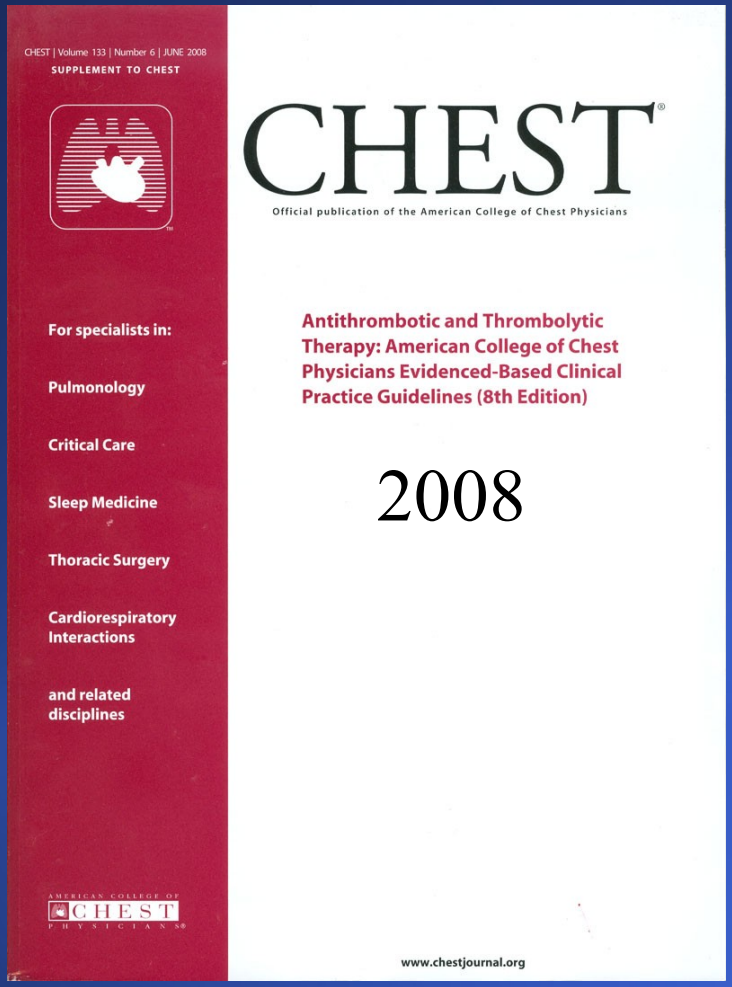
What's New in Venous Disease?

Acute DVT

Recommendations

"In […patients] with extensive proximal DVT…and low risk for bleeding…we suggest that ***CDT may be used*** to reduce acute symptoms and post-thrombotic morbidity…"

…GRADE 2B…



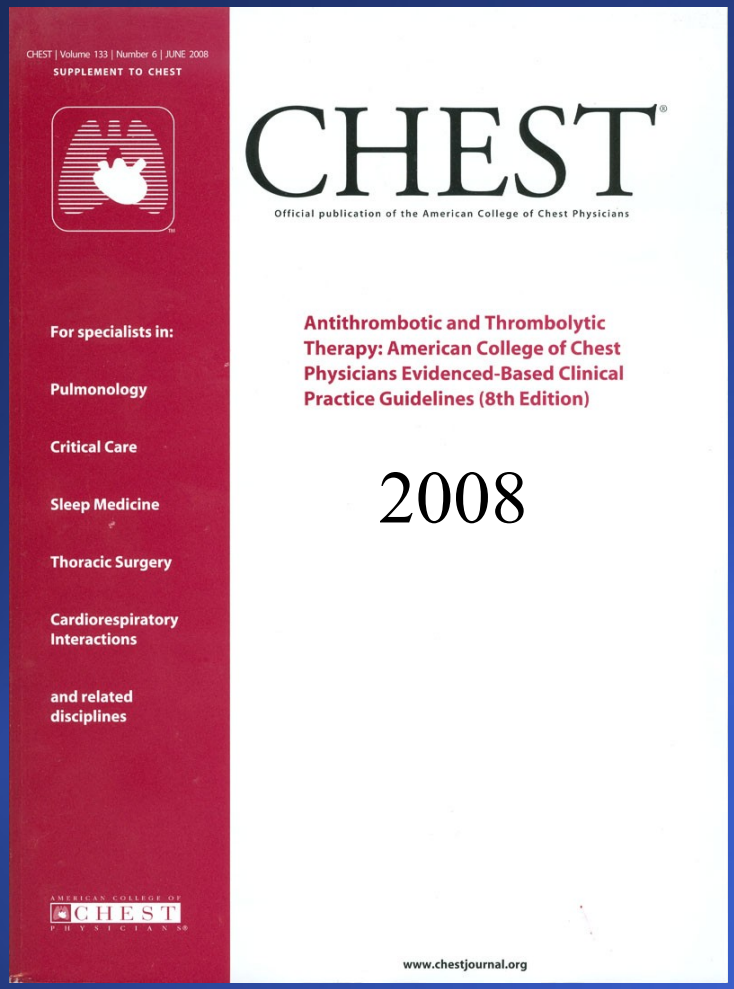
What's New in Venous Disease?

Acute DVT

Recommendations

"We ***suggest pharmacomechanical thrombolysis***, in preference to CDT alone, to shorten treatment time…"

…GRADE 2C…

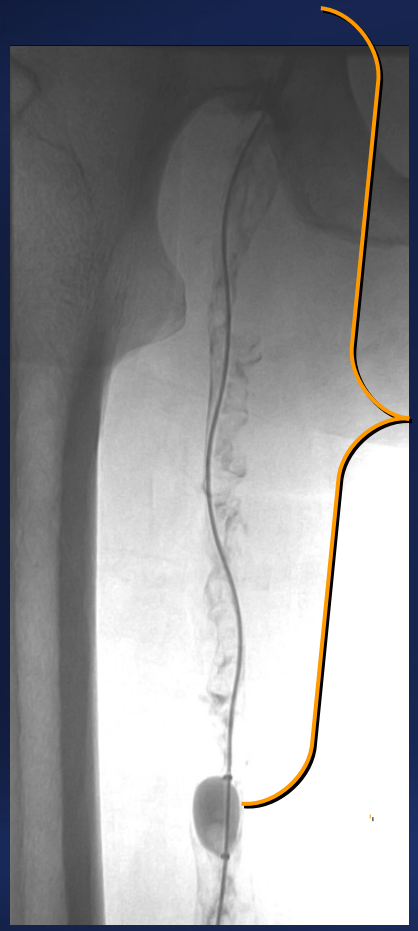


Catheter-Directed Thrombolysis for IFDVT

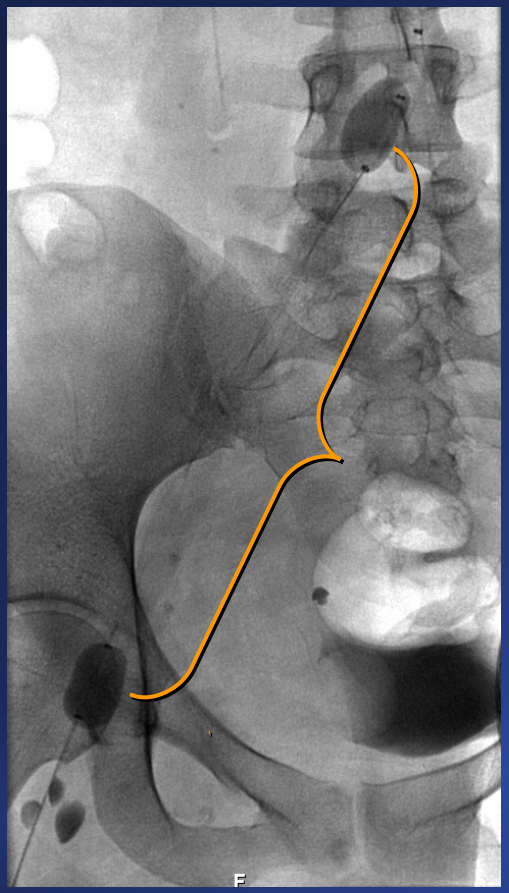
Can success be improved with pharmacomechanical techniques?

ISPMT for Iliofemoral DVT

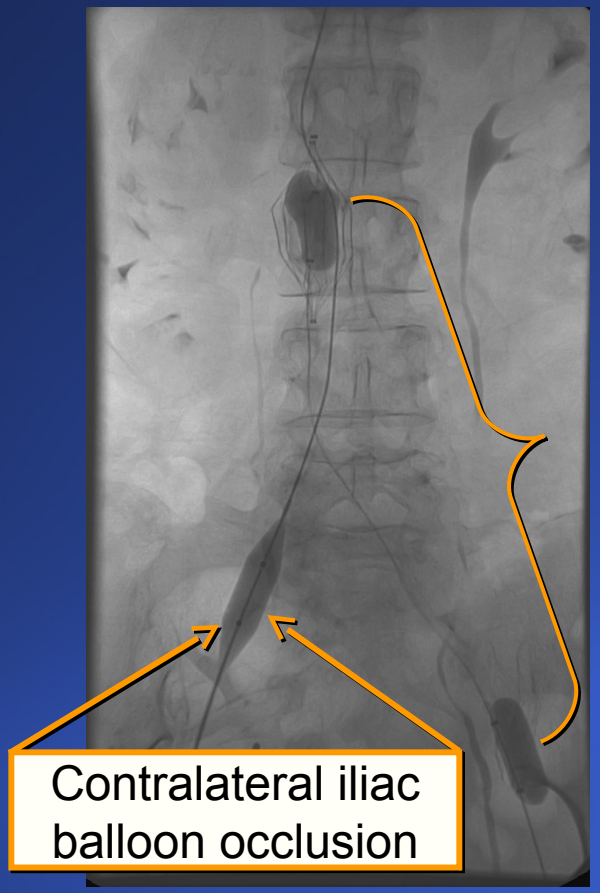
ISPMT: Treated Segments



Femoral



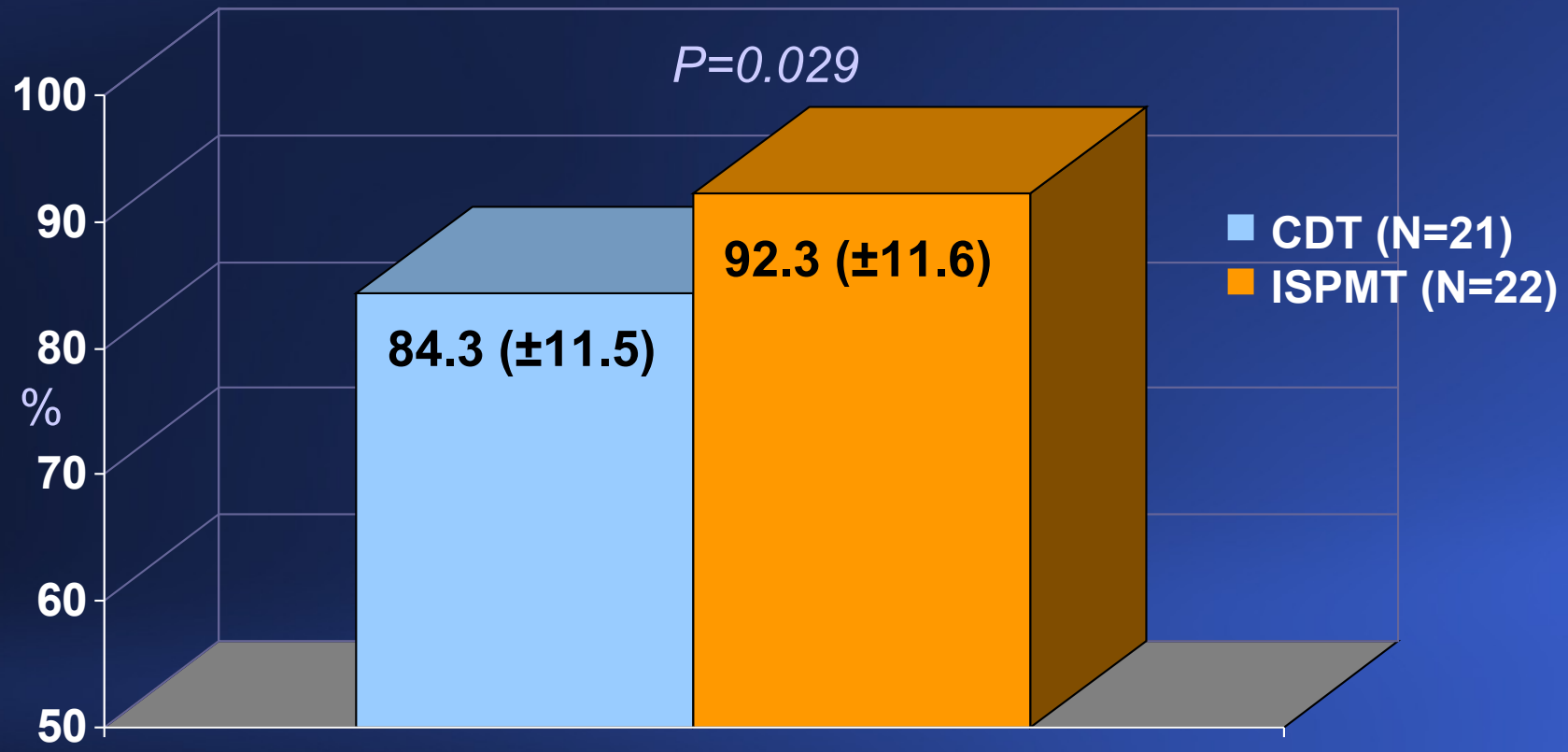
Iliofemoral



Iliocaval

ISPMT for Iliofemoral DVT (N=43)

Overall Lysis (Mean)



Martinez J
J Vasc Surg 2008;48

ISPMT for Iliofemoral DVT (N=43)

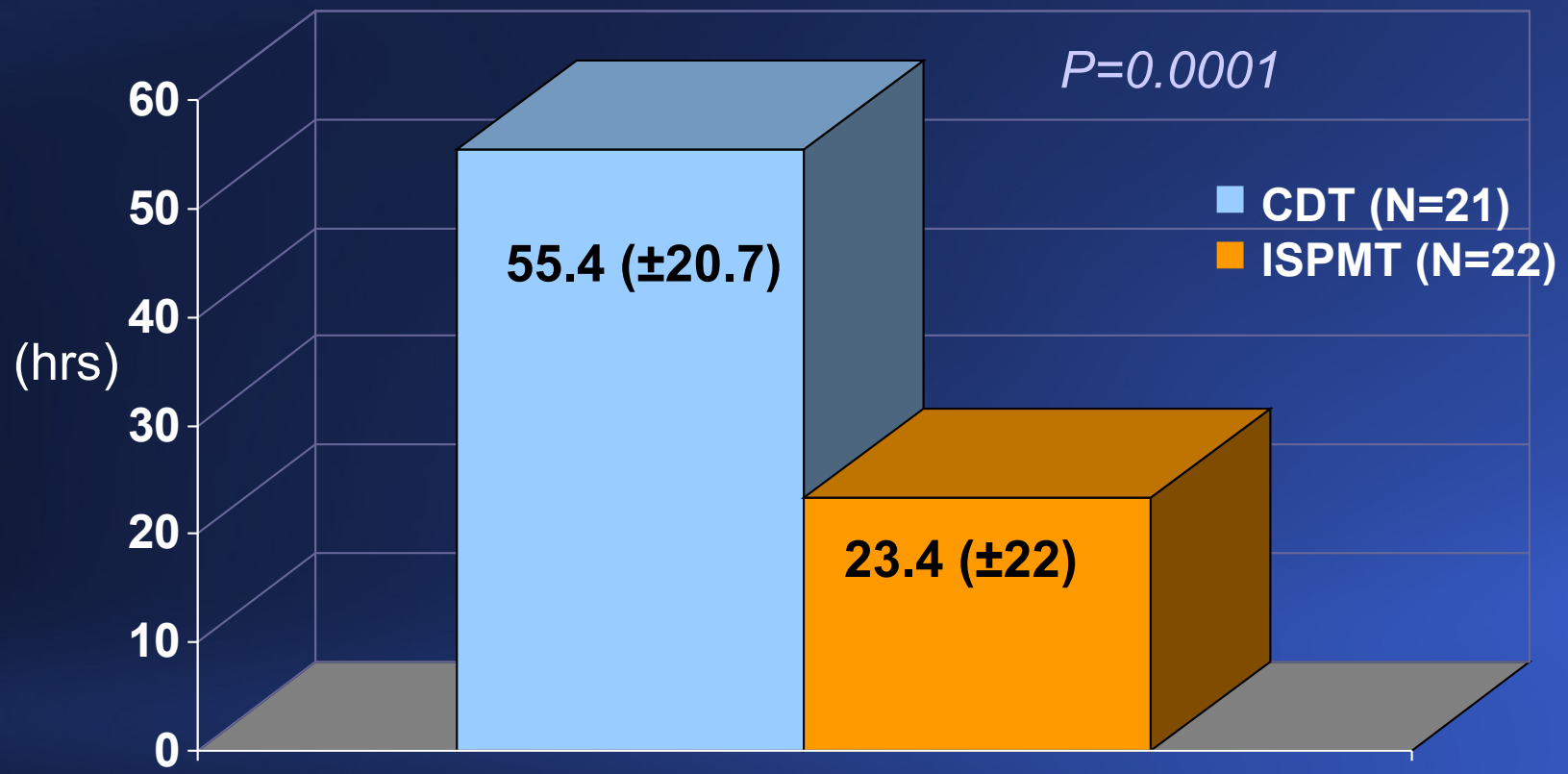
Thrombus Resolution

	CDT (N=21)	ISPMT (N=22)	*p-value*
Overall Lytic Success	84%	92%	*0.029*
Sig/Complete (≥50%)	70%	95%	*0.001*
Minimal (<50%)	30%	5%	*0.01*

Martinez J
J Vasc Surg 2008;48

ISPMT for Iliofemoral DVT (N=43)

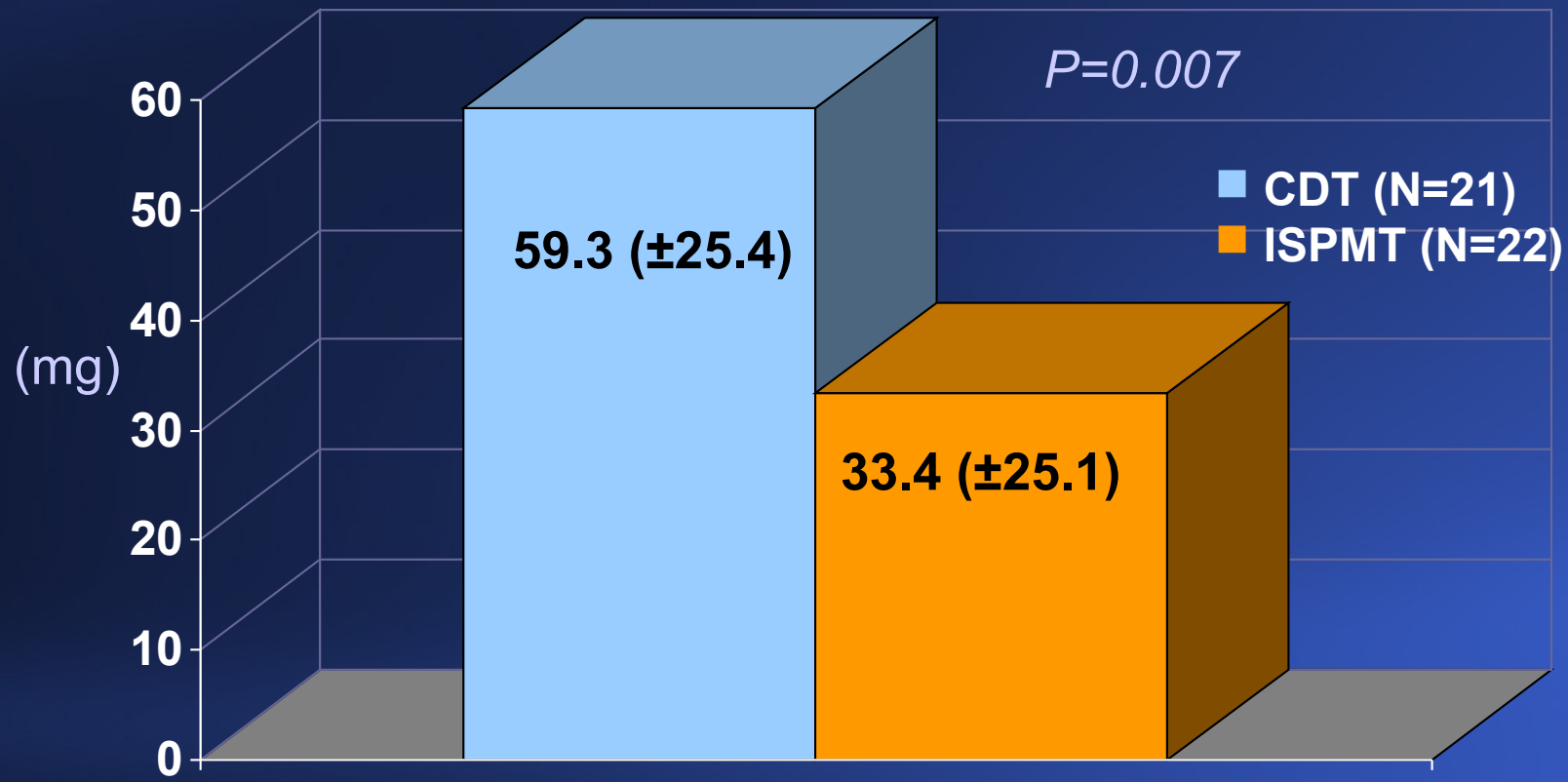
Treatment Time (Hours)



Martinez J
J Vasc Surg 2008;48

ISPMT for Iliofemoral DVT (N=43)

Total Dose t-PA (mg)



Martinez J
J Vasc Surg 2008;48

Catheter-Directed Thrombolysis for IFDVT

Can success be improved with pharmacomechanical techniques?

YES!

- Shorter treatment times
- Lower dose of plasminogen activator
- More effective thrombus removal

CDT Vs. PMT

Question?

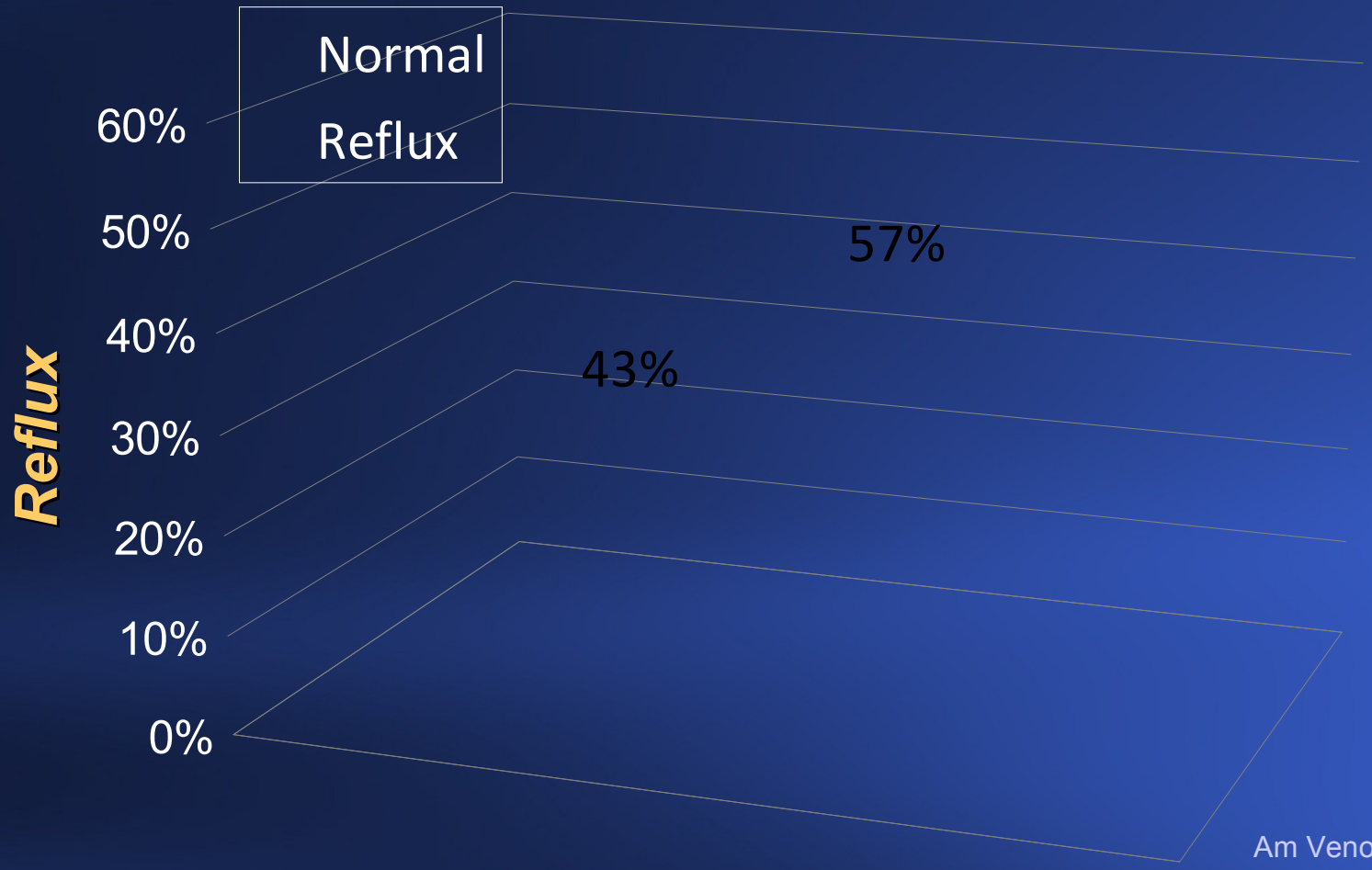
– Valve Function –

Does Pharmacomechanical thrombolysis adversely affect venous valve function vs. CDT drip technique alone?

Results

Valve Function

- All Treated Limbs -

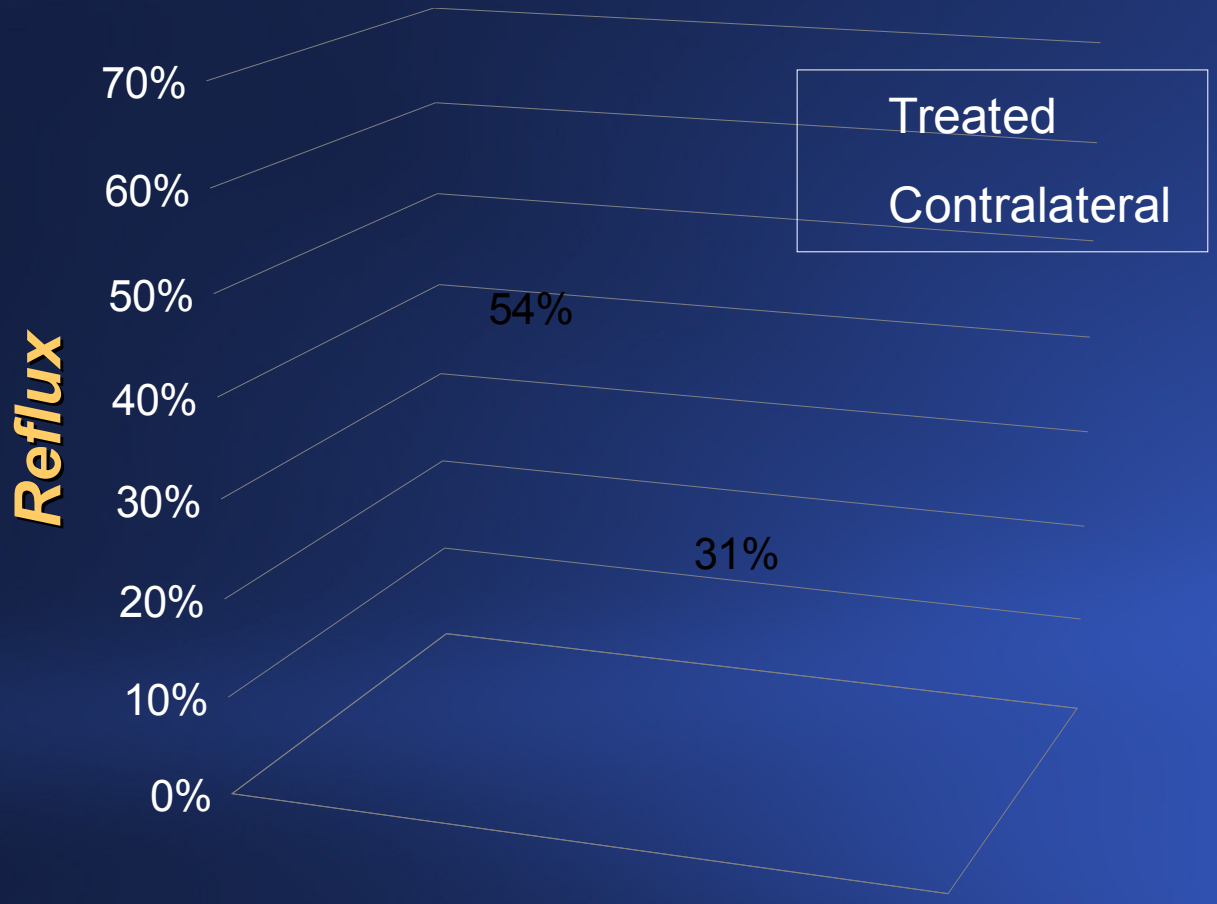


Vogel D et al
Am Venous Forum 2011

Results

Valve Function

- Unilateral DVT -

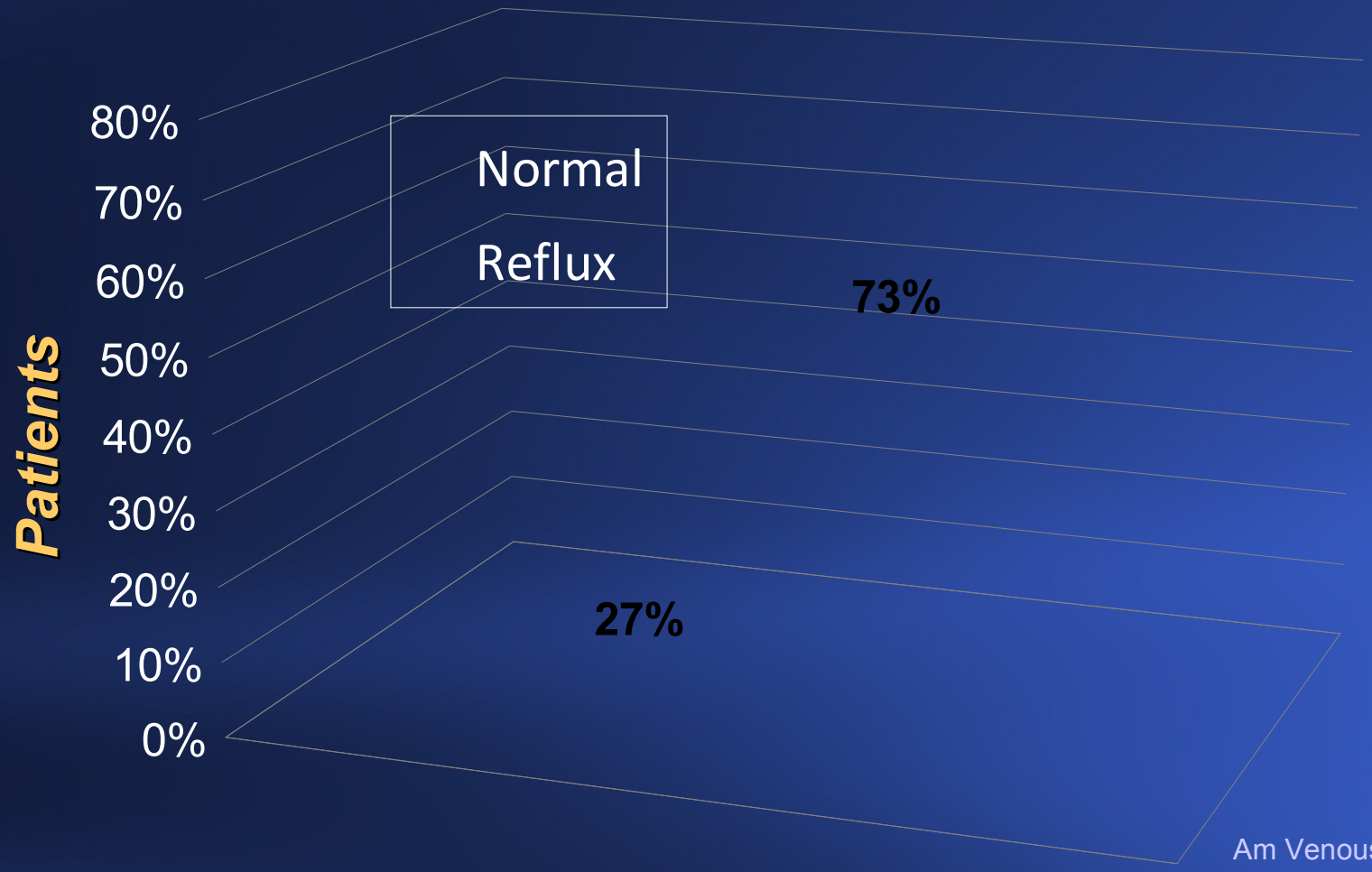


Vogel D et al
Am Venous Forum 2011

Results

Valve Function

- Bilateral DVT -

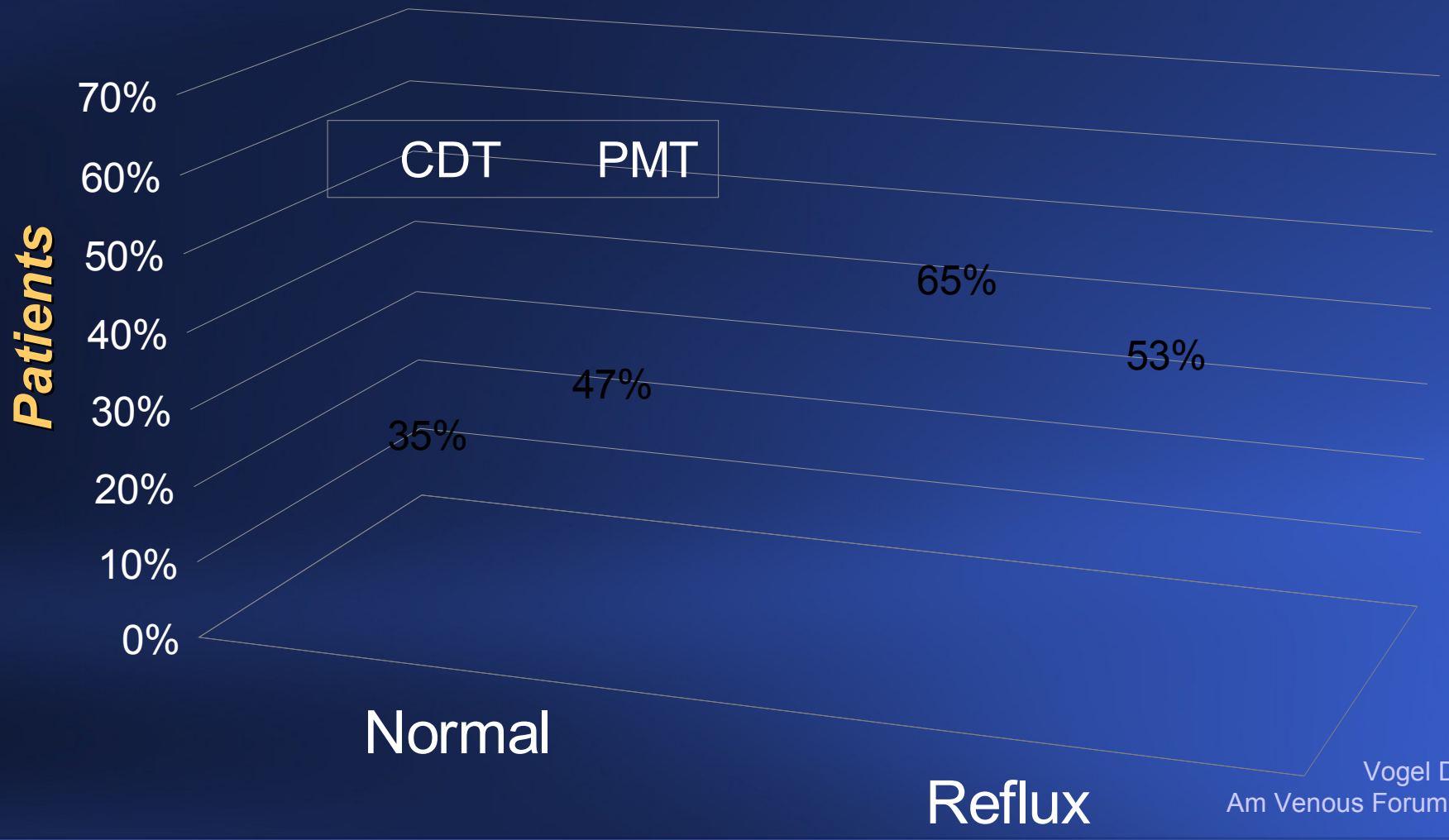


Vogel D et al
Am Venous Forum 2011

Results

Valve Function

- All Treated Limbs -



Vogel D et al
Am Venous Forum 2011

Conclusions

1. No adverse effect of PMT on venous valve function
2. Unexpectedly high frequency of venous reflux following successful lysis
3. Unexpectedly high rates of reflux in contralateral (uninvolved) limbs

Vogel D et al
Am Venous Forum 2011

Catheter based Strategy of Thrombus Removal

Observation

Few patients develop recurrent DVT…

…many fewer than reported in the literature

Question?

Does successful CDT/PMT
reduce recurrent DVT?

Outcome Measures after IFDVT Lysis

Overall Results

75 Patients

35 month follow-up
(Range 1 – 144 Months)

Recurrence = 7 (9%)

Initial Lysis *(1-100)*	Clinical Class of CEAP *(0-6)*	Villalta Score *(0-33)*
79% *(mean)*	1.4 *(mean)*	3.81 *(mean)*

Results

Results by Group

75 Patients

(Follow-up 35 months – mean)

≤ 50% Residual Thrombus

Recurrence 5% (3/67)

p=0.0014

> 50% Residual Thrombus

Recurrence 38% (3/8)

Conclusions

- Effective (preferred) for IFDVT
- Reduces PTS
- Improves QOL
- PMT more rapid/efficient
- PMT does not affect valve function
- Successful lysis reduces recurrence

JOBST
VASCULAR INSTITUTE