Pharmacomechanical versus surgical thrombectomy for acute IF DVT
Comparison of the outcomes

O Hartung, P Nicolini
CHU Nord, Marseille
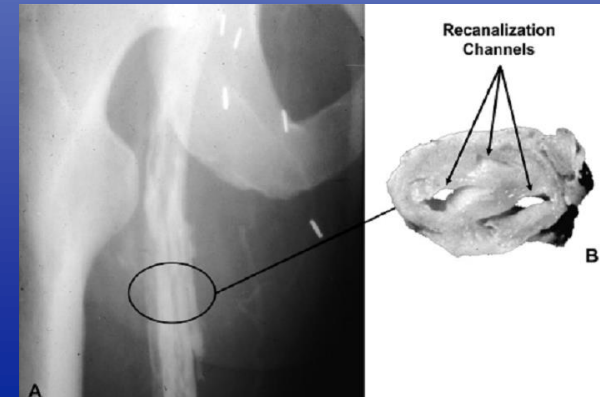Clinique du Grand Large, Lyon

Acute DVT

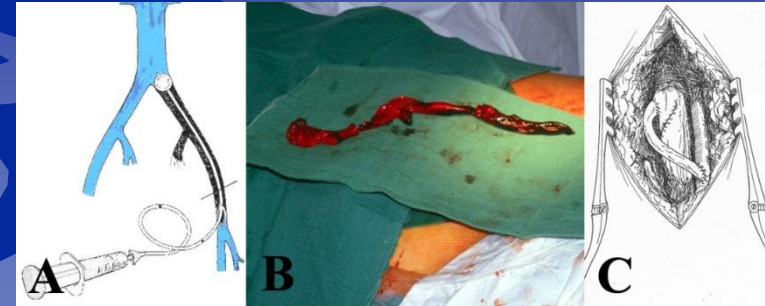- **Anticoagulants => do not treat the thrombus**

- **Goals of interventional treatment**
  - Avoid thrombus progression, recurrence and PTS
  - Suppress the clot
    - Without embolization
    - Without living underlying obstructive lesions
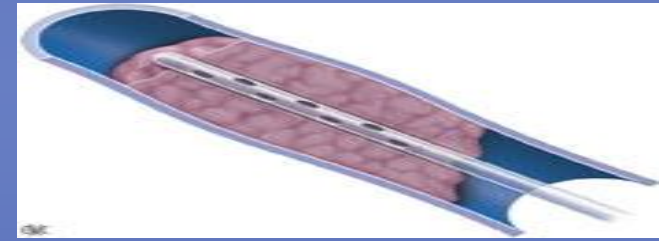   - Preserve the valves
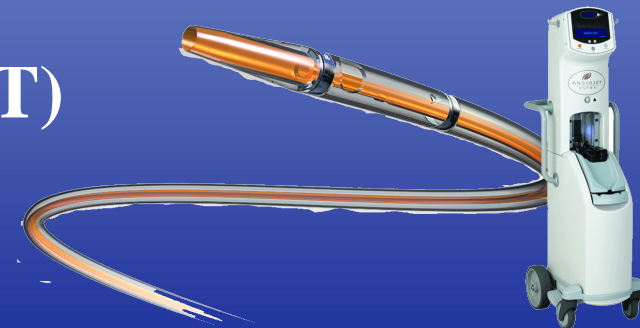
Clot removal strategies

- **Surgical thrombectomy**

- **Catheter directed thrombolysis**
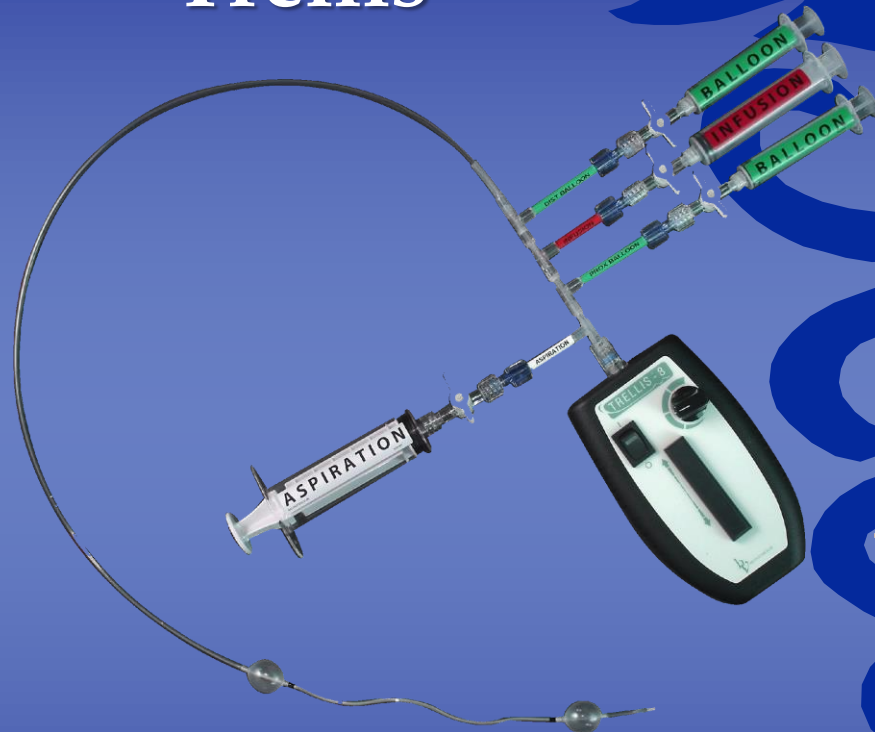
- **Pharmacomechanical CDT (PCDT)**

Our experience

- **35 years of surgical thrombectomy**
  - ↪ + stenting since 1995

- **Single session PCDT +/- stenting**
  - ↪ Since 2013

Devices

Trellis

Angiojet Zelante

Aspirex

Patients

	ST	ss PCDT
Dates	1995-2007	2013-2017
N	29	31
Women	65%	67%
Age median (range)	38 (19-72)	39 (16-76)
Thrombophilia	34%	35%
Pregnancy/postpartum	17%	13%
Symptoms duration	3 days (1-10) $p < 0.001$ days (1-21)	
IVC extension	24%	19%
Suprarenal IVC	0	12%
History of DVT	20% (2 ST)	16% (1 ST)
History of venous stenting	0	16%
CI CDT	37%	22%
ST	0	29%
CDT + ST	0	12%

Procedure

	ST	ss PCDT
General anesthesia Local + sedation	100%	30% (PN) 70% (OH)
Approach	Surgical	Percutaneous
Technique	Thrombectomy + AVF	Trellis 13 Aspirex 3 Angiojet 15
Thrombolytic	0	100%
IVC filter	0	19%
Stenting	100%	93% 7% on stented patients
Length of stented vein	60 mm (30-120)	160 mm (60-430)
-without IVC involvement	60 mm (30-120)	135 mm (60-220)
Procedure length		113 min (45-200)

$p < 0.001$

- **24 years woman**
  - No thrombophilia
  - Oral contraception

- **Acute Left popliteal femoro-iliac DVT + PE**
  - 4 days since symptoms onset

- **Right CFV echo-guided approach**
  - IVC filter
  - Cross over ss PCDT + stenting (Vici 16*90)

IVC filter thrombosis

Postoperative course

	ST	ss PCDT
Length of stay	8 days (5-22) p< 0.001	3 days (1-8)
early complications (<30 days)	8 (27%)	3 (9%)
-major bleeding	6 (20%) p = 0.049	1[#] (3%)
-minor bleeding	unknown	1 (3%)
-rethrombosis	3 (10%)	1 (3%)
-sPE, death	0	0
Transfusion	0 for FI DVT 100% cell-saver	0
Secondary procedure for AVF closure	26/30*	NA

Follow-up

	ST	ss PCDT
Median length	63 months (2-137)	19 months (2-51)
Patency rates at 24 months		
-primary	78.9% p = 0.049	96%
-assisted primary	86.1% p = 0.188	96%
-secondary	86,1% p = 0.052	100%
Villalta	4 (1-11) p< 0.001	2 (0-4)
VCSS	3 (1-12) p< 0.001	1 (0-5)
VDS	1 (0-2) p = 0.575	1 (0-2)

Author	Tech	N	Acute results	Complications	Stenting	FU	Late results
Bush[12]	A	20	Complete removal 65% Partial removal 35%	2 access site H 1 HRP	61%	10	No data
Cynamon[13]	A	24	Lysis II/III 79%	MB 8%	37%	5.3	Recurrence 2
O'Sullivan[14]	T	19	Lysis II/III 96%	3 rethromboses No sPE/MB	100%	1	aPP 100%
Arko[15]	18 T, 12 A	30	6 incomplete thrombus removal => CDT	No sPE/MB	56%	6	Patency 90% Competence 88%
Hilleman[16]	T	147	Lysis II/III 93%	MB 0%	32%		
Rao[17]	T 12, A 13 T + A 17	43*	37% adjunctive CDT Lysis II/III 95%	No sPE/MB	35%	5	95% without rethrombosis
Gasparis[18]	A	14	52% adjunctive CDT Lysis II/III 100%	No sPE/MB	65%	24	36% reflux 93% VCSS <5
Murphy[19]	A T	18 15	Lysis 88% vs 72% Residual thrombus 340 vs 788 mm^3	No MB	100%	12	P 94% Reflux 9%
Chaudry[20]	T	28	Lysis II/III 100%	No sPE/MB	78%		Patency 80%
Gagne[21]	T	142	Lysis II/III 87% 29% adjunctive CDT	No MB	54%	12	Low severe PTs rate
Bozkurt[22]	C	16	2 failure (>14 days)	No sPE/MB	56%	6	12/13 patent at DS
Bloom[23]	A	11**	Lysis >70% 100% 2 rethrombosis => second procedure	20% IVC filter with thrombus	72%	20	100% Villalta <5 No reflux
Yuksel[24]	C	46	Technical success 91%	No sPE/MB	NS	16	Patency 79.5% Villalta <5 67.5%
Dopheide[25]	A	24		No sPE/MB	100%	6	PP 92%, SP 100% 96% Villalta <5
Hartung	T 13, A 15	31	Lysis >70% 100%	No sPE	96%	19	PP 96.7%, SP 100% at 24M

Comparative studies

Author	Technique	N	Acute results	Complications	Stenting	FUM	Late results
Kim	A + CDT CDT	14 23	30/56 hours [SS] UK 2.9/6/7 M [SS] Venograms 2.5/3.4 [SS] Complete lysis 84%/80% 5128/10127 $ [SS]	MB 5.3% vs 7.7% PE 5.3% vs 3.8%	15%/23%	32	Recurrence 2 vs 5
Lin	A CDT	52 46	Lysis III 75%/70% Procedure length 76 min/18h[SS] Improvement 81%/72% Venograms 0.4/2.5 [SS] ICU LOS 0.6/2.4 days [SS] LOS 4.6/8.4 days [SS] 47 742/85 301 $ [SS]	Transfusion need <[SS] MB 0/1	82%/78%	13	PP 68% vs 64%
Huang	A CDT	16 18	Thrombolysis rate 81%/67%[SS] Lysis II 100%/88%	No sPE/MB	83%/42%[SS]	12	PP 93.8% vs 88.9% Villalta 2 vs 5[SS]

RCT

Trial	Technique	N	Acute results	Complications	Stent	FU	Late results
Torpedo	T or A BMT	91 92	LOS 2.7/5.8	PE 0%/4% Bleeding 2%/1%	29%	30	Recurrence 4.5%/16% PTS 6%/29%
Attract	T, A and/orCDT BMT	336 355		MB 1.7% vs 0.3% [ss]	28%	24	Recurrence 12%/8% Villalta 3.4/4.5 [ss] Villalta>5 43%/43% VCSS 1.8/2.4 [ss] PTS 31%/36% VEINES 27/23

Conclusion

- **ss PCDT : sure and efficient technique**
  - Better than ST regarding
    - Invasiveness
    - Complications
    - Length of stay
  - At least as good as ST for mid-term
    - Patency rates
    - Clinical results
- **But longer length of stented vein**