

Endovaskuläre Therapie beim akuten Schlaganfall: Aktuelle Literatur

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Variable Parameter beim akuten Schlaganfall

- **Alter**
- **Ko-Morbiditäten, Gefäß-Elongation**
- **NIHSS bei Aufnahme**
- **Zeitfenster**
- **Kollateralen**
- **Infarkt-Frühzeichen (CCT)**
- **Gefäßverschluss**

Endovaskuläre Therapie:

- **RT-PA Lyse IV / IA**
- **Rekanalisations-Device**
- **Expertise**

Randomisierte Therapiestudien IV/IA Lyse

Vorderer Kreislauf 2009

Trial	Median NIHSS on admission		Time to treatment	Stroke Imaging	Good Neurologic Outcome 90 days	Symptomatic Bleeding Rate	
	N	Treatment/Agent			Placebo / Verum	Placebo / Verum	Placebo / Verum
NINDS* [7]	624	IVT/ rt-PA	15/14	<3h	Native CCT	26% / 39%	0,6% / 6,4%
ECASS I: ITT [8]	620	IVT/ rt-PA	12/13	<6h	Native CCT	29,3% / 35,7%	6,5 / 19,8%+
ECASS I: TP [8]	511	IVT/ rt-PA	12/13	<6h	Native CCT	29,2%/ 40,9%	5,9 / 15,3%+
ECASS II [9]	800	IVT/ rt-PA	11/11	<6h	Native CCT	36,6% / 40,3%	3,4% / 8,8%+
ECASS III* [10]	821	IVT/ rt-PA	9/10	3-4,5h	Native CCT	52,4% / 45,2%	0,2% / 2,4%
ATLANTIS [11]	613	IVT/ rt-PA	10/10	3-5h	Native CCT	32% / 34%	1.1% / 7.0%
DIAS 2 [13]	186	IVT/ Desmoteplase	9/9	3-9h	Multimodal MR or CT	46% / 90µg/kg: 47,4% /125µg/kg: 36,4%	0% / 90µg/kg: 3,5% /125µg/kg: 4,5%
PRO-ACT* [12]	180	LIT/ r-proUK	17/17	<6	CT/ Angiography	25% / 40%	2% / 10%

Clin Neuroradiol, Vol.19, 2009

PROACT II , 1998

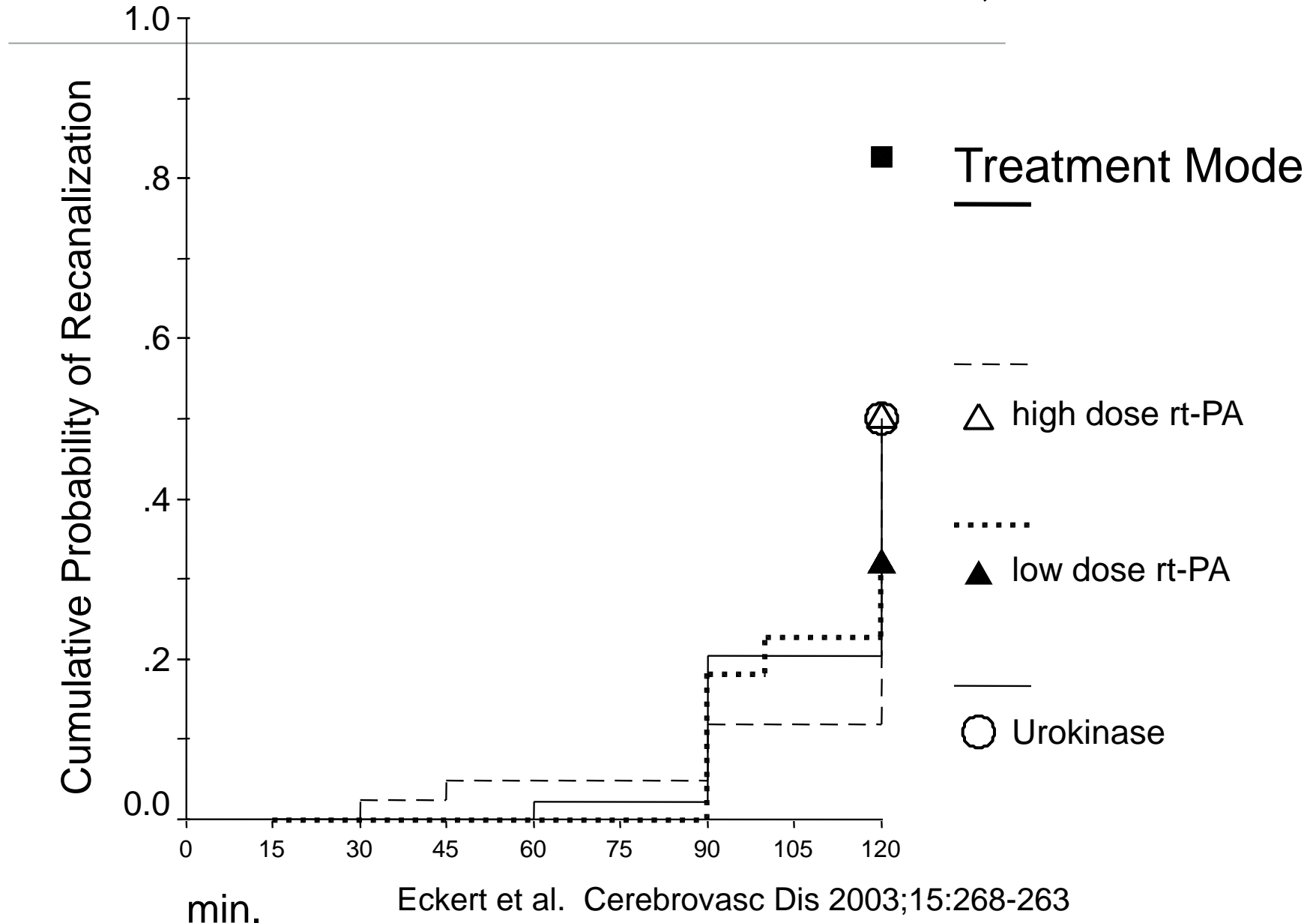
Intra-arterial Prourokinase for Acute Ischemic Stroke

M1/2-Verschluß \leq 6h, 180 Pat.

9mg r-proUK i.a. + Heparin i.v.(n=121) versus Heparin i.v.(n=59)

%	PROACT II Placebo	PROACT II Verum
Favorable Outcome	25	40
Mortality	27	25
Symptomatic Bleeding	2	10
Recanalization TIMI 2-3	18	66

Time to Recanalization within 120min, Carotid Territory



min.

Eckert et al. Cerebrovasc Dis 2003;15:268-263

„Hyperdense Media“: IVT vs. Lokale Lyse Haus zu Haus Vergleich



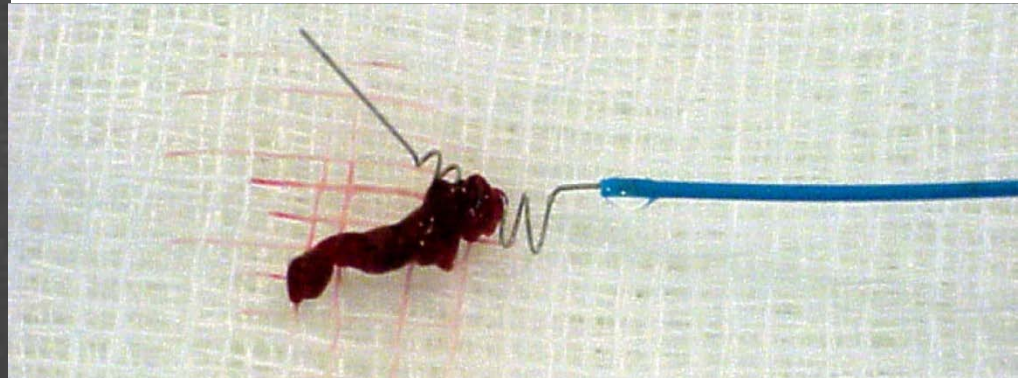
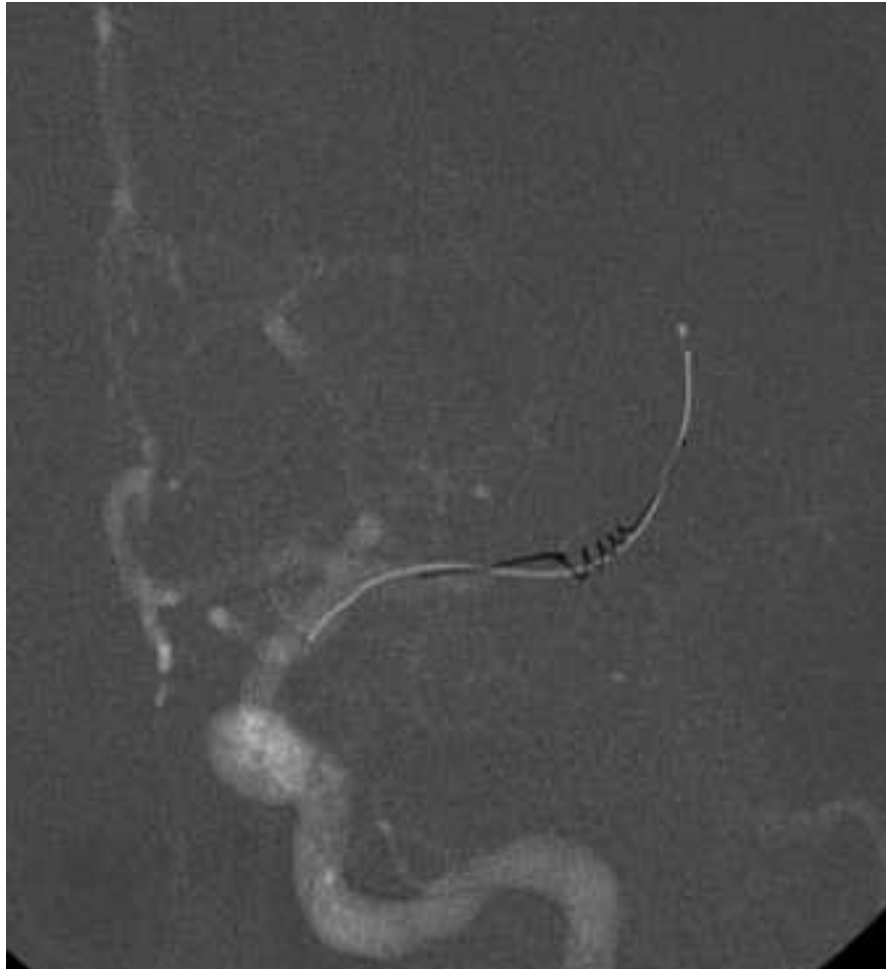
	No of pts.	HMCAS	NIHSS	Time to treatment	mRS 0-2 3 months	Mortality 3 months	sICH
Zurich IVT	249	57 (23%)	17.5	156 minutes	13 (23%)	13 (23%)	1 (2%)
Berne IAT	268	55 (21%)	16.7	244 minutes	29 (53%)	4 (7%)	4 (7%)

Mattle et al, Stroke 2008

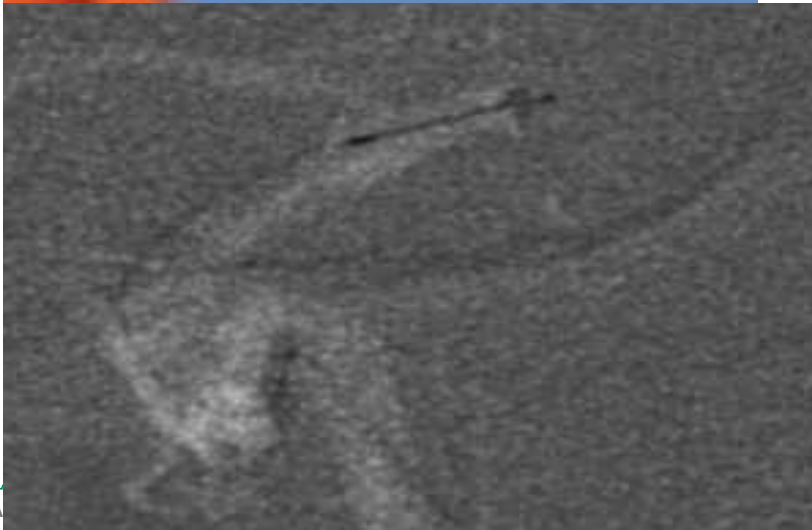
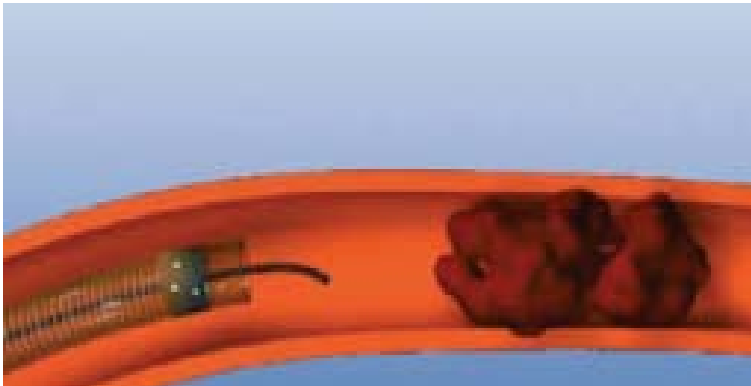
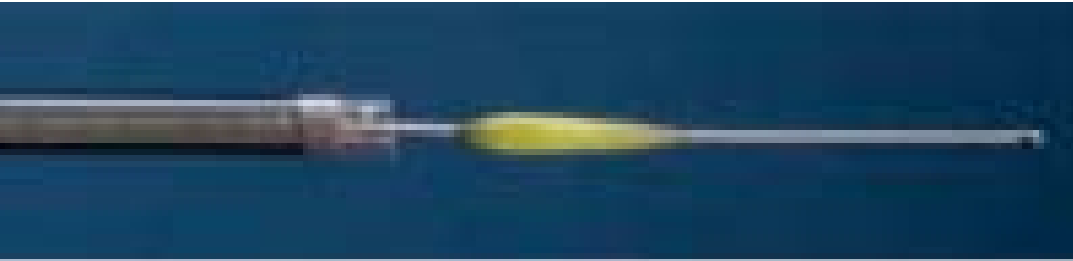
$P < 0.0001$ $P < 0.022$



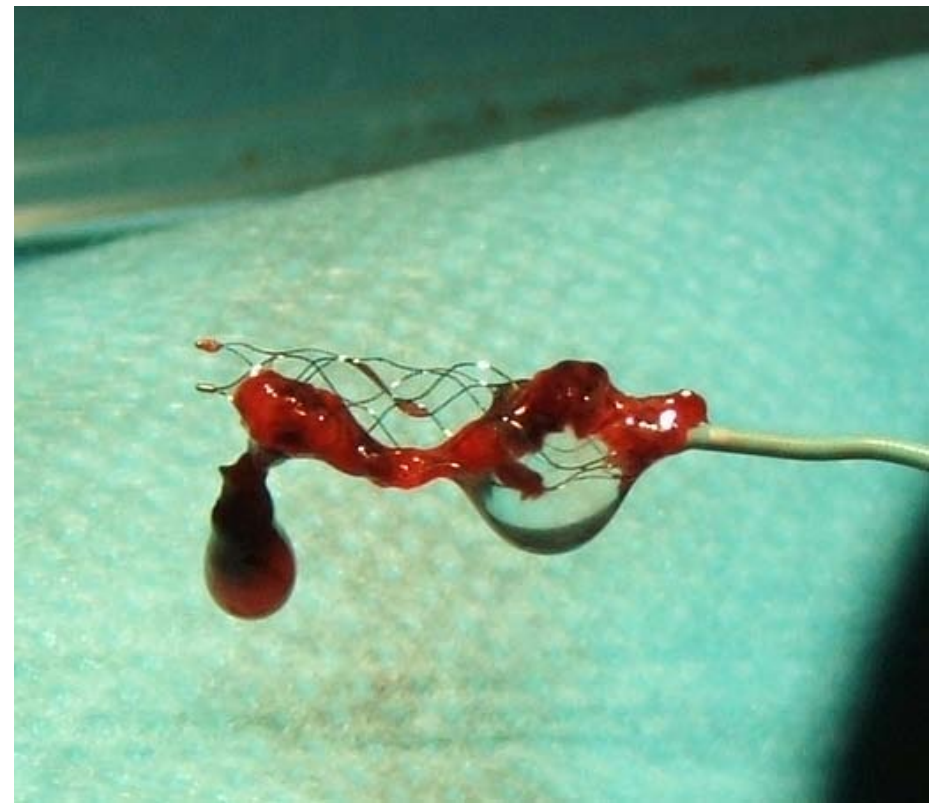
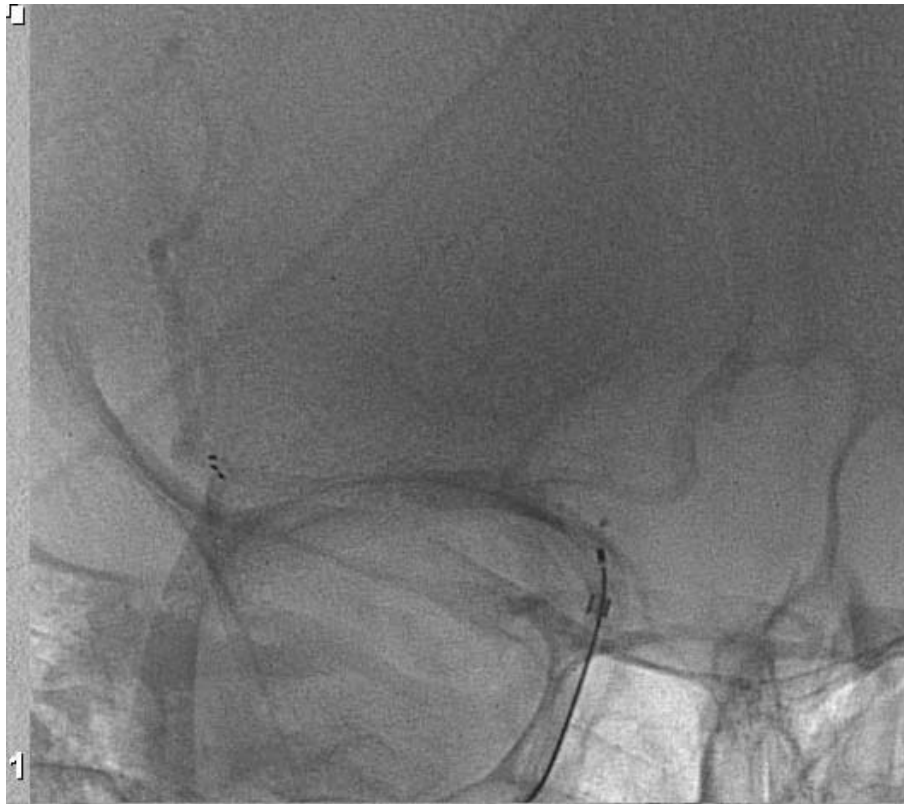
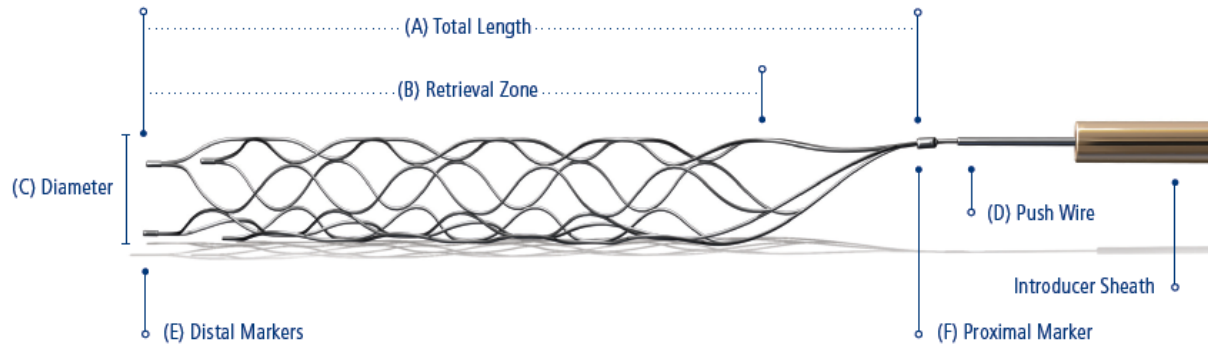
Merci Retriever



Penumbra Aspiration



Stentriever: Solitaire



Endovascular Therapy after Intravenous t-PA versus t-PA Alone for Stroke

Joseph P. Broderick, M.D., Yuko Y. Palesch, Ph.D., Andrew M. Demchuk, M.D., Sharon D. Yeatts, Ph.D., Pooja Khatri, M.D., Michael D. Hill, M.D., Edward C. Jauch, M.D., Tudor G. Jovin, M.D., Bernard Yan, M.D., Frank L. Silver, M.D., Rüdiger von Kummer, M.D., Carlos A. Molina, M.D., Bart M. Demaerschalk, M.D., Ronald Budzik, M.D., Wayne M. Clark, M.D., Osama O. Zaidat, M.D., Tim W. Malisch, M.D., Mayank Goyal, M.D., Wouter J. Schonewille, M.D., Mikael Mazighi, M.D., Ph.D., Stefan T. Engelter, M.D., Craig Anderson, M.D., Ph.D., Judith Spilker, R.N., B.S.N., Janice Carrozzella, R.N., B.A., R.T.(R.), Karla J. Ryckborst, R.N., B.N., L. Scott Janis, Ph.D., Renée H. Martin, Ph.D., Lydia D. Foster, M.S., and Thomas A. Tomsick, M.D., for the Interventional Management of Stroke (IMS) III Investigators

IMS III

IV rt-PA

222

IV rt-PA + Intervention

434

Endovascular Treatment for Acute Ischemic Stroke

Alfonso Ciccone, M.D., Luca Valvassori, M.D., Michele Nichelatti, Ph.D., Annalisa Sgoifo, Psy.D., Michela Ponzio, Ph.D., Roberto Sterzi, M.D., and Edoardo Boccardi, M.D., for the SYNTHESIS Expansion Investigators*

SYNTHESIS

IV rt-PA

181

Intervention

181

A Trial of Imaging Selection and Endovascular Treatment for Ischemic Stroke

Chelsea S. Kidwell, M.D., Reza Jahan, M.D., Jeffrey Gornbein, Dr.P.H., Jeffrey R. Alger, Ph.D., Val Nenov, Ph.D., Zahra Ajani, M.D., Lei Feng, M.D., Ph.D., Brett C. Meyer, M.D., Scott Olson, M.D., Lee H. Schwamm, M.D., Albert J. Yoo, M.D., Randolph S. Marshall, M.D., Philip M. Meyers, M.D., Dileep R. Yavagal, M.D., Max Wintermark, M.D., Judy Guzy, R.N., Sidney Starkman, M.D., and Jeffrey L. Saver, M.D., for the MR RESCUE Investigators*

MR-Rescue

N=118

N=34 (Intervention + „mismatch“)

N=30 (Intervention - „mismatch“)

N=34 (standard care + „mismatch“)

N=30 (standard care - „mismatch“)

IMS III Studie: IVT vs. IVT + Endovaskulär

Recruitment: 2004-2012

Keine CTA erforderlich, NIHSS ≥ 10

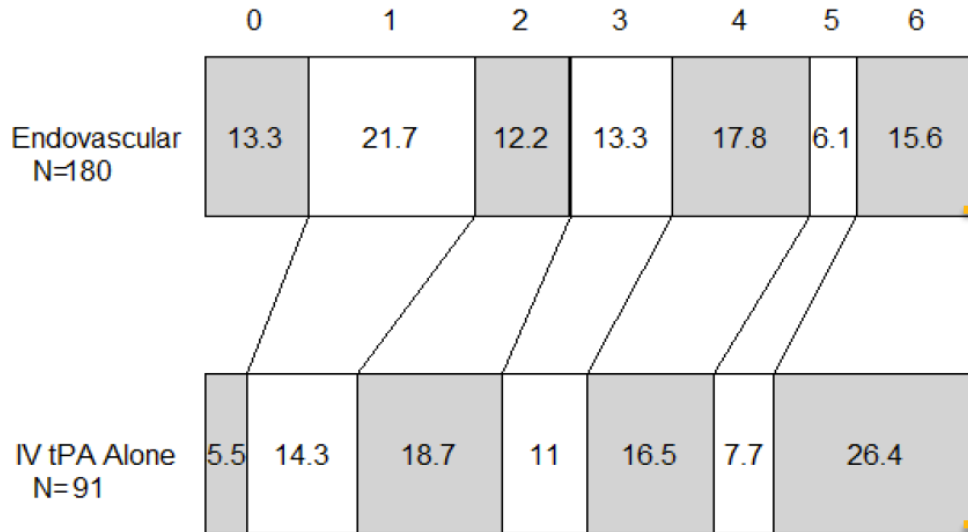
Stent-Retriever (Solitaire): N=4

	No of pts.	Gefäß verschluß	NIHSS Median	Time to IVT	mRS 0-2 3 months	Mortality 3 months	SiCH <30h
IVT+ Endo vaskulär	434	ACI/ACM	17	122 minutes	41%	19%	6%
IVT	222	?	16	121 minutes	39%	22%	6%

Broderick, J.P. et al. N Engl J Med 2013

IMS III subgroups: Occlusion in CTA

90-Day mRS Distribution, Baseline CTA Occlusion Present



van Elteren test p-value 0.0114



A. Demchuk, IMS III: Comparison of Outcomes between IV and IV/IA Treatment in Baseline CTA Confirmed ICA, M1, M2 and Basilar Occlusions, slide 20, Presented at ISC 2013, Honolulu, Hawaii

Endovascular confers a real benefit across the spectrum of mRS
EVT: 47.2% vs IVT: 38.5%

Rekan	IVT	IVT+EVT
CTO	34%	81%
M1	68%	86%

MR Rescue: Penumbra vs Non-Penumbra Standard Care vs. Endovaskulär (<8h)

Recruitment: 2004-2011

MRT, MRA, MR-Perfusion (80%)

Stent-Retriever (Solitaire): N=0, IA Lyse: Max 14 mg!, Merci/Penumbra

	No of pts.	Gefäß verschluß	NIHSS Median	Time to Enrollment Mean	mRS 0-2 3 months	Mortality 3 months	SiCH <30h
Endo vaskulär	64	ACI/ACM	16/19	5,3h	19%	19%	5%
Standard care	54	ACI/ACM	16/20	5,7 h	20%	24%	4%

Kidwell CS et al. N Engl J Med 2013

Sytnhesis: IVT vs. Endovaskulär

Recruitment: 2008-2012

CCT: Blutungsausschluß; keine CTA; Frühinfarkte ?, NIHSS ?

Stent-Retriever (Solitaire): N= 18, Trevo: N=5 (IA Lyse auch ohne Gefäßverschluß!)

	No of pts.	Gefäß verschluß	NIHSS Median	Time to Treatment	mRS 0-2 3 months	Mortality 3 months	SiCH <30h
Endo vaskulär	181	?	13	3,8 h	30%	26%	6%
IVT	181	?	13	2,8 h	35%	18%	6%

Ciccone A. et al. N Engl J Med 2013

Lancet 8/2012: SWIFT und TREVO2

	<u>Solitaire</u>	Merci	<u>Trevo</u>	Merci
N	58	55	88	90
ACI/Media	98%	98%	92%	94%
Basilaris	2%	2%	8%	6%
NIHSS Mean	17	17	18	18
Rekan.	83%	48%	85%	66%
mRS 0-2 (3M)	37%	28%	40%	22%
SICH	2%	11%	7%	9%
Death	17%	38%	34%	24%

Fazit: Stentriever signifikant bessere Rekan. und good Outcome

Saver et al. www.thelancet.com Published online August 26, 2012 [http://dx.doi.org/10.1016/S0140-6736\(12\)61384-1](http://dx.doi.org/10.1016/S0140-6736(12)61384-1)

Nogueira et al. August 26, www.thelancet.com 2012 [http://dx.doi.org/10.1016/S0140-6736\(12\)61299-9](http://dx.doi.org/10.1016/S0140-6736(12)61299-9)

Solitaire : Star Trial 2013

N= 214, 14 Centers

Carotis-T(18%) Media (82%, M1: 67%)

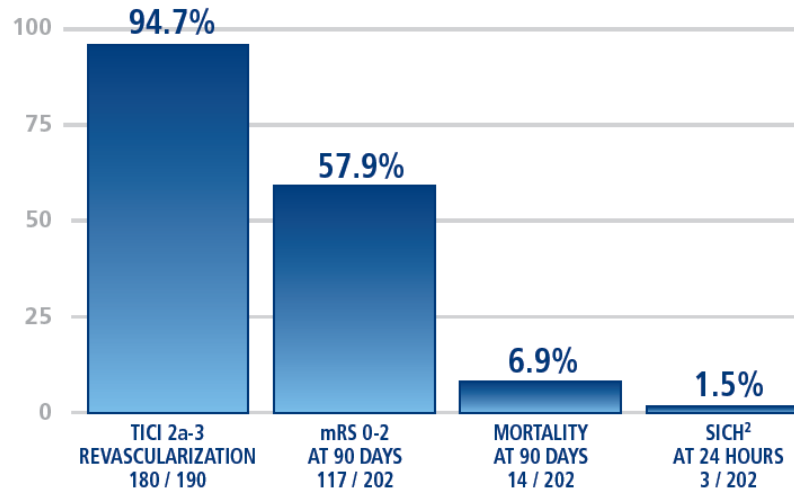
<8h stroke onset, 18-85(72), NIHSS 8-30 (17), CCT ASPECT > 6

IVT: 59%, nur MT: 41%

Passes: 1,5

Groin to Recan: 32 min

Core Lab TICI 2b/3: 85%



Vitor Mendes Pereira, Interventional Neuroradiology University Geneva , ICS 2013

SWIFT-PRIME: IVT vs. IVT+Solitaire

SOLITAIRE™ FR with the Intention for Thrombectomy as Primary Endovascular Treatment (SWIFT – PRIME) Randomized Clinical Trial

Covidien: Positive Results for Life

European PIs:

Professor Chris Diener
Dr. Vitor Mendes-Pereira

North American PIs:

Dr. Jeffrey Saver
Dr. Elad Levy

Steering Committee

Independent CEC Board, DSMB, and Core Lab

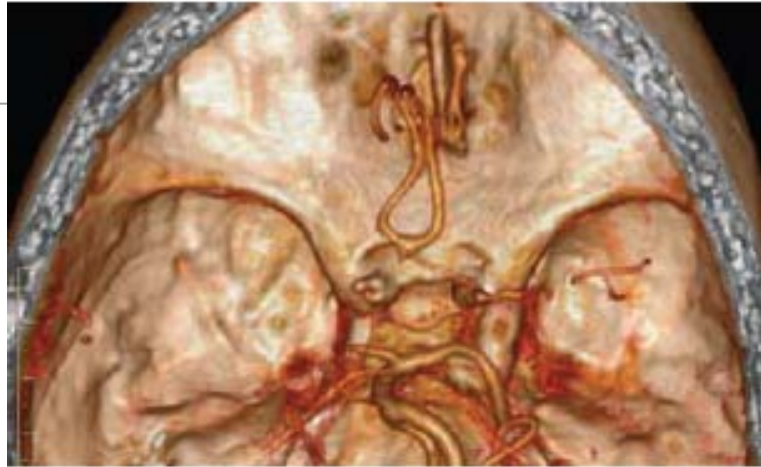
Zusammenfassung

- **NEJM randomisierte Studien ohne Stentriever**
- **LANCET Studien: Stent-Retriever besser als Merci**

- **Neue Studien mit CTA/MRA und Stentriever**

Entscheidend für Erfolg:

- **Patientenauswahl (Cave: >80J; <60J einschließen)**
- **Frühinfarkt (CCT, DWI)**
- **Expertise**



HAST

3. Hamburger Acute Stroke-Workshop

Diagnostik und Therapie des akuten Schlaganfalls
12. und 13. Dezember 2013