



Société Française de
l'Abord Vasculaire

Quelle sténose veineuse centrale je traite ... et comment ?

Bernard Beyssen et Pierre Chagué
Radiologie Vasculaire
Paris et Neuilly sur Seine



 Groupe Hospitalier Privé
Ambroise Paré - Hartmann

Paris, le 9 décembre 2023

Abord d'hémodialyse et obstacles des troncs veineux profonds

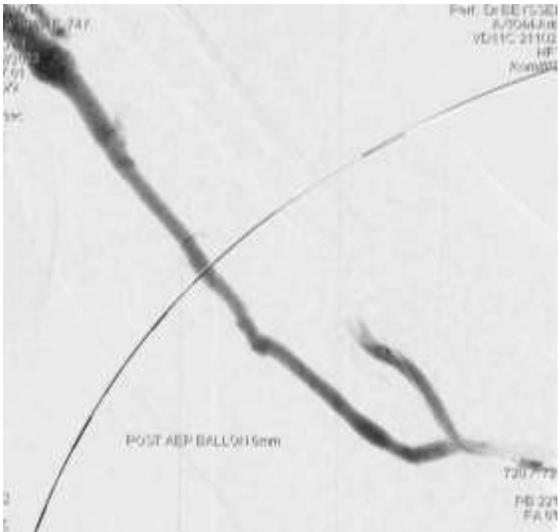
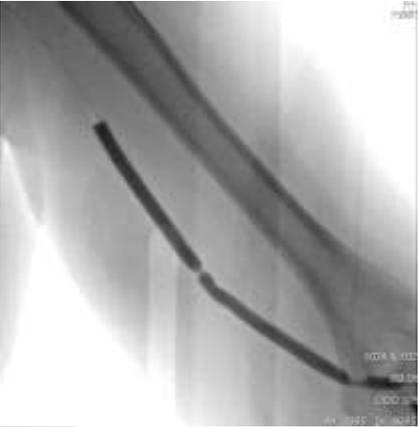
- **Mise en évidence d'une sténose serrée des troncs veineux profonds :**
 - Cliniquement au niveau scapulaire
 - Echo-Doppler le plus souvent peu contributif
 - Au cours d'une angiographie (phlébographie avant création d'un abord ou lors d'une fistulographie ++)

*Toute lésion significative se traduit habituellement par une **collatéralité +++***

- **Elles doivent être respectées quand elles sont asymptomatiques ++**
 - Elles ne majorent pas les pressions veineuses de façon importante
 - Elles ne sont presque jamais responsables de l'occlusion d'un abord



Abord brachial immature superficialisé



Central Venous Stenosis Is More Often Symptomatic in Hemodialysis Patients with Grafts Compared with Fistulas

Scott O. Trerotola, MD, Shawn Kothari, BA, Therese E. Sammarco, BA, and Jesse L. Chittams, MA

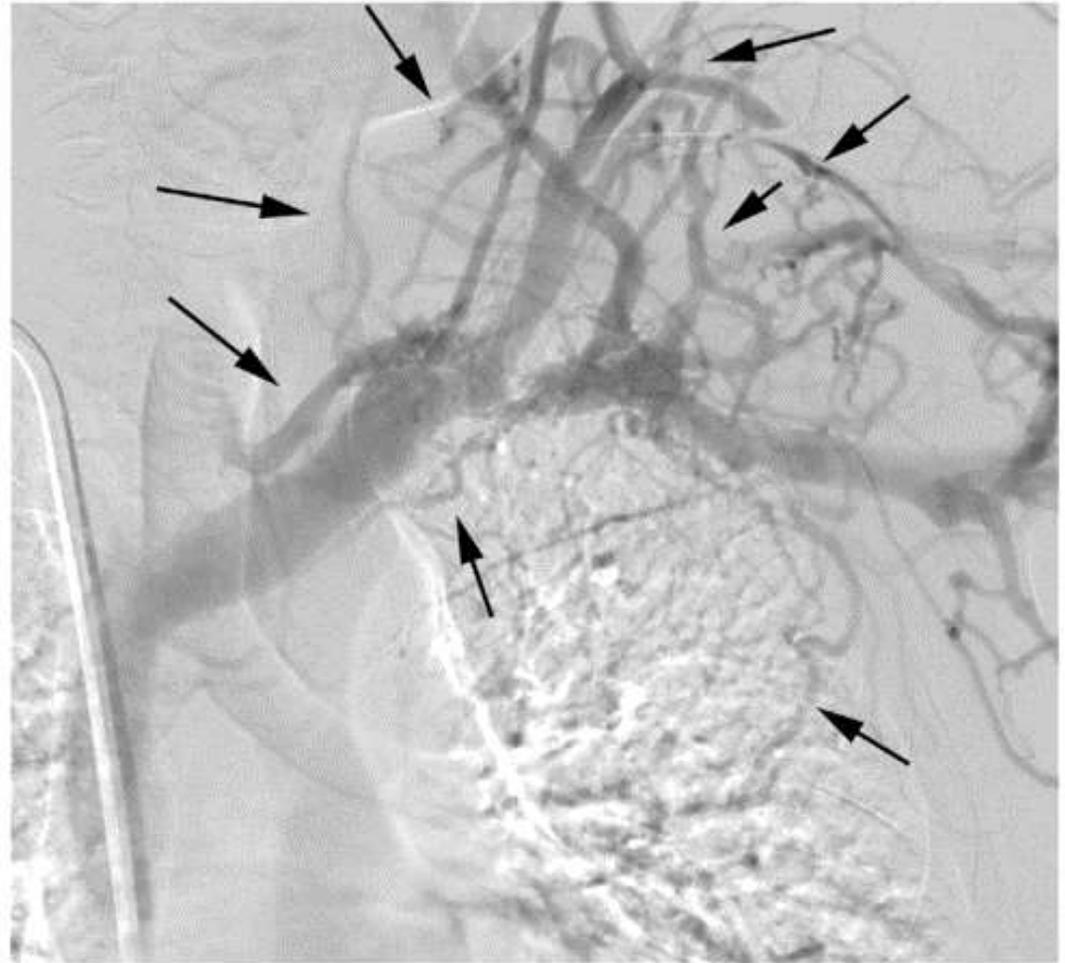
Retrospective review of 469 consecutive patients, who had fistulograms performed over a 4-year period. CVS was present in 51% of patients with fistulas (119 of 235) and 51% of patients with grafts (118 of 234)

Access Type	No. with CVS	CVS Location				Symptomatic
		BCV	SCV	SVC	Iliac	
Fistula	119	68	76	2	0	35 (29%)
Graft	118	53	81	0	3	62 (52%)
All	237	121	157	2	3	97 (21%)

Upper arm access were more symptomatic than forearm access (p < 0.0001)



a.



b.

Asymptomatic central venous occlusion in a patient with a left forearm fistula and no symptoms. Early (a) and later (b)

Comparative outcomes of treated symptomatic versus non-treated asymptomatic high-grade central vein stenoses in the outflow of predominantly dialysis fistulas

Claude J. Renaud^{1,5}, Maud Francois³, Alain Nony⁴, Mahammed Fodil-Cherif⁵ and Luc Turmel-Rodrigues⁵

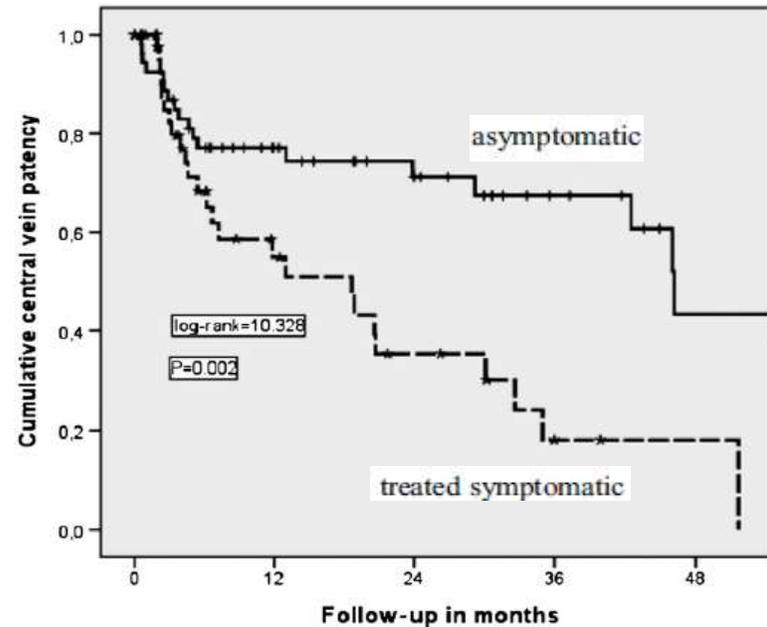
Rétrospective entre 1998 et 2010, avec en moyenne sténose > 80%

Table 2. Clinical outcomes of all followed up central vein stenoses^a

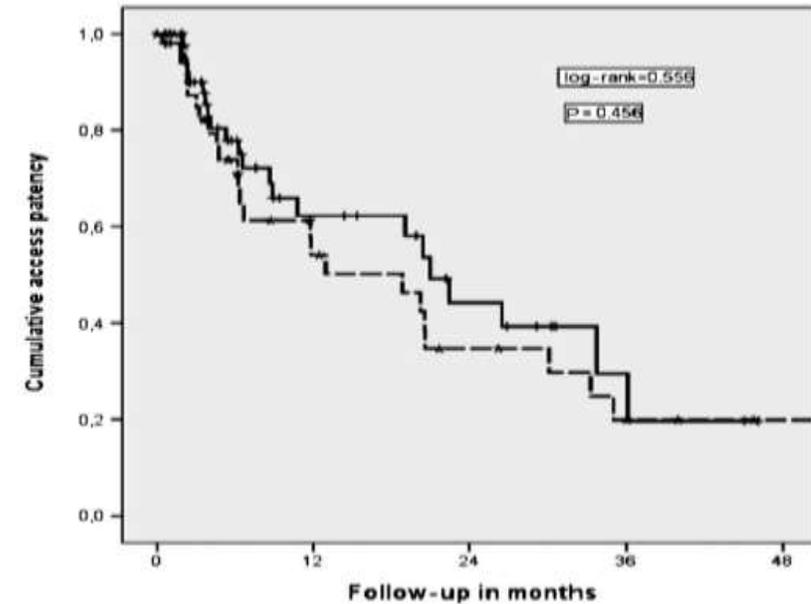
Event at end of follow-up	Asymptomatic CVS 53	Symptomatic CVS 49 ^a
Functional asymptomatic access (%)	17 (32)	16 (32)
Ligated access (%)	1 (2) ^b	6 (12) ^c
Transplant (%)	2 (3)	3 (6)
Loss to follow-up (%)	0	3 (6)
Death (%)	12 (23)	22 (44)
Developed symptoms (%)	21 (40)	NA

Angioplastie patients symptomatiques
 - 100 % ballon Haute Pression
 - 59 % stents (recoil ou resténose précoce)

No significant difference was observed between the primary and secondary central vein patency rate of stenoses, which received PTA only or a combination of PTA and stent at first treatment ($P = 0.217$)



central vein primary patency



primary access circuit patency

« Treatment in asymptomatic CVS in dialysis fistulas yielded significantly better short- and long-term central vein patency than treatment of symptomatic cases without detrimental effects on overall dialysis circuit. »

Abord d'hémodialyse et lésions occlusives symptomatiques des TVP

- œdème unilatéral \pm important, parfois associé à une impotence de la main
- syndrome cave supérieur en cas de lésion cave supérieure ou sténoses bilatérales

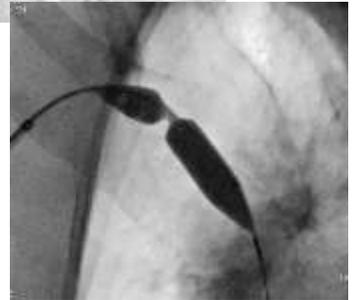


« Pas de gros bras, pas de dilatation »



Traitement des lésions occlusives symptomatiques des Troncs Veineux Profonds

- Toute lésion **symptomatique** se traduisant par un œdème invalidant du bras doit être traitée
- Par le bras (FAV) de première intention ... en cas d'échec un abord fémoral est à envisager (à plus faible risque de complication)
- Angioplastie par ballon de calibre adapté (12 à 16 mm ++) après franchissement par un couple guide + cathéter
- Ballons haute pression ++ avec cartographie de l'empreinte sur le ballon
- Ballons actifs ?
- Stenting en cas de recoil avec persistance de la collatéralité ou resténose < 3 mois
- En cas d'occlusion, le taux d'échec de recanalisation est faible autours de 10 à 20 %

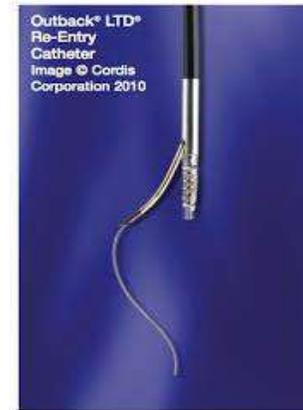
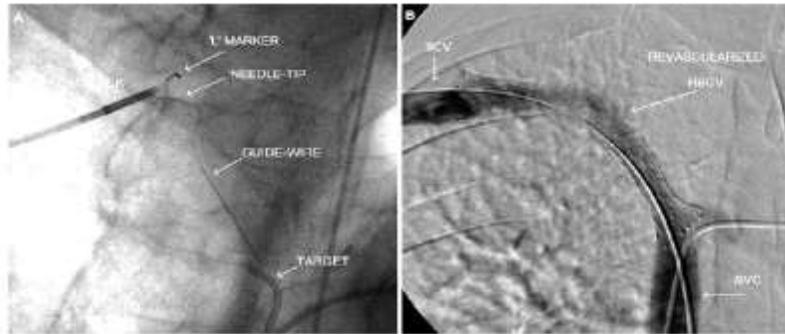


En cas d'échec de recanalisation

Revascularization of an occluded brachiocephalic vein using Outback-LTD re-entry catheter

Gopinathan Anil, MD, FRCR, and Manish Taneja, MD, FRCR, Singapore

J Vasc Surg 2010;52:1038-40



Success Rate and Complications of Sharp Recanalization for Treatment of Central Venous Occlusions

Emil L. Cohen¹ · Christopher Beck¹ · Jesse Garcia² · Ryan Muller² · Hyun J. Bang² · Keith M. Horton² · Farris Hakki²

Cardiovasc Intervent Radiol (2018) 41:73–79



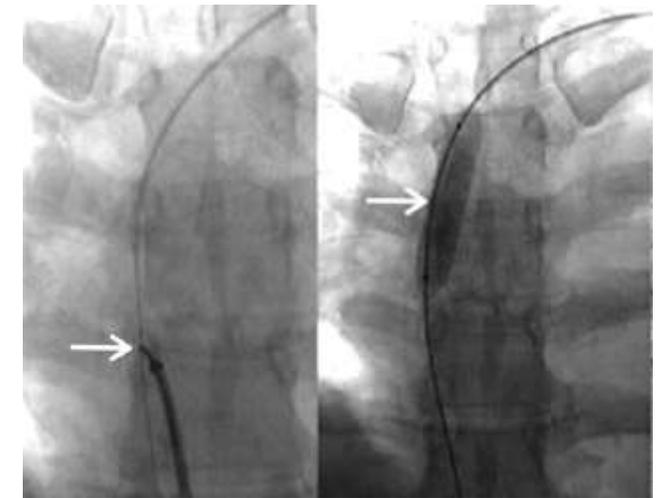
- Chiba angulée 21 gauge (Cook) ou sabre de biopsie hépatique par voie transjugulaire (Cook)
- Occlusion de 10 à 110 mm
- Introducteur long
- Succès : 37 / 39
- Complications : 2 hemo péricardes



Single-Center Retrospective Review of Radiofrequency Wire Recanalization of Refractory Central Venous Occlusions

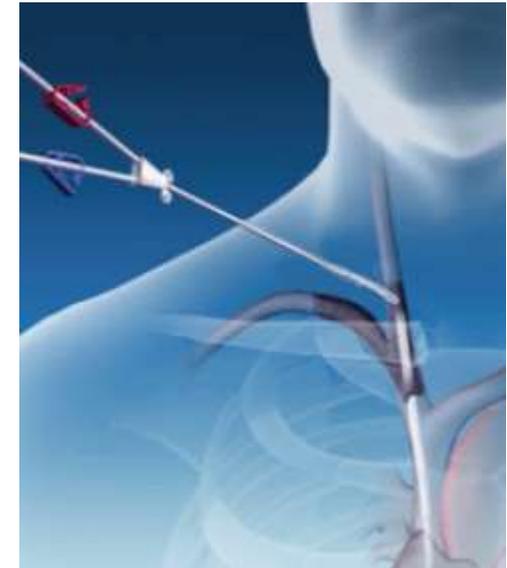
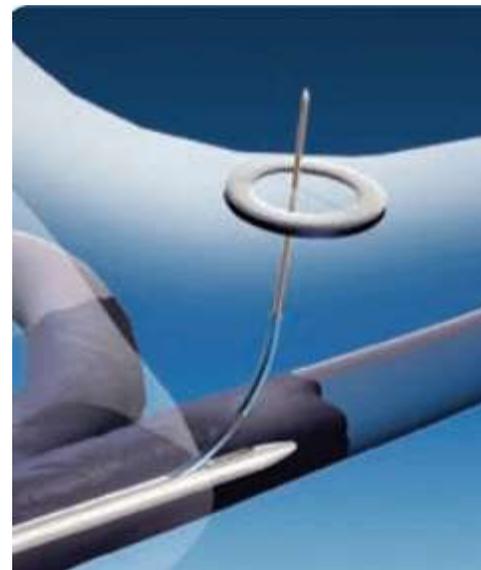
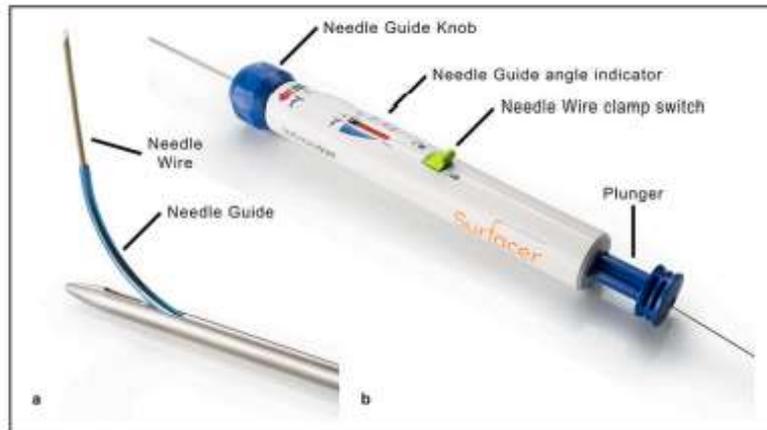
Eric J. Keller, MD, MA, Suraj A. Gupta, MD, Sergey Bondarev, MD, MS, Kent T. Sato, MD, Robert L. Vogelzang, MD, and Scott A. Resnick, MD

J Vasc Interv Radiol 2018; 29:1571–1577

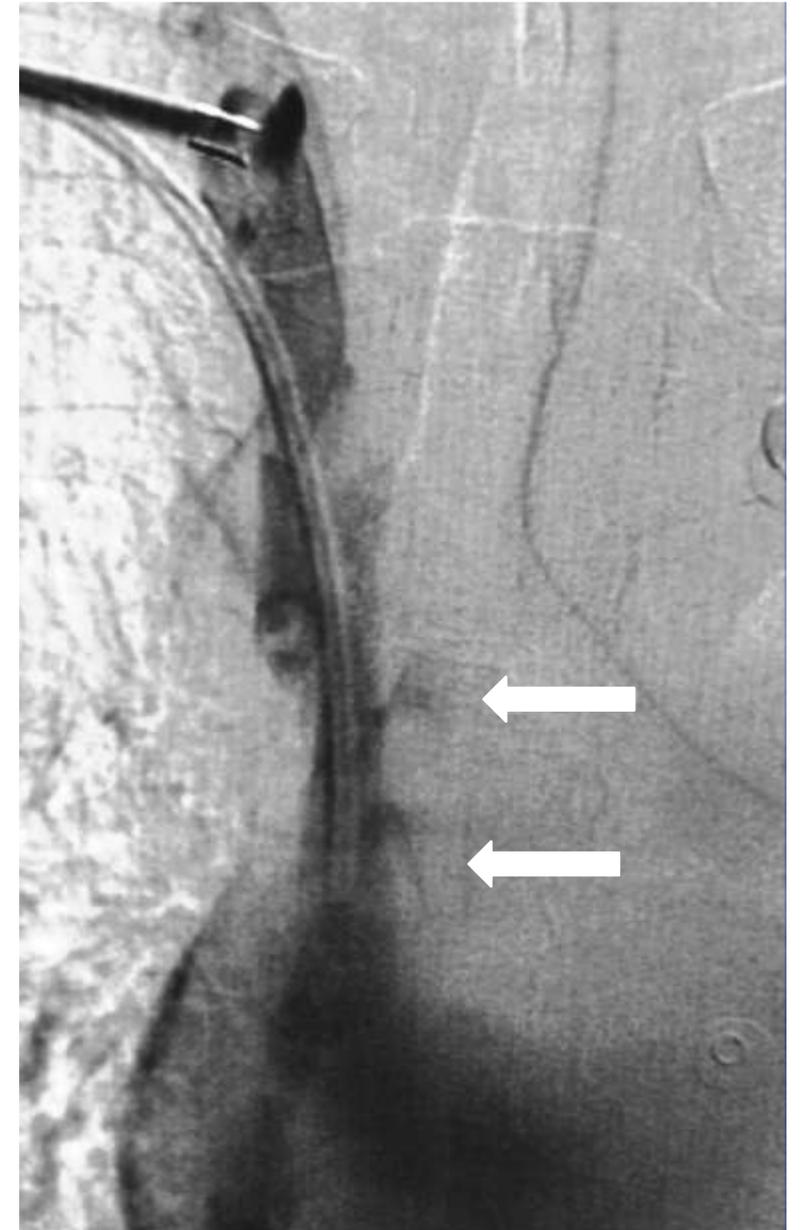
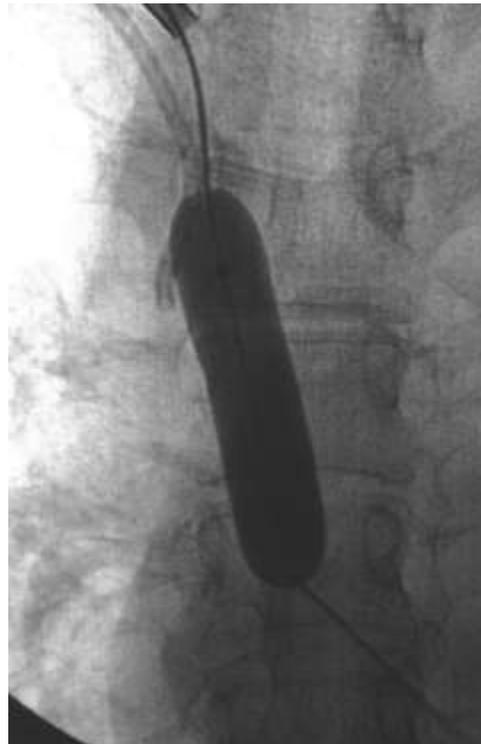
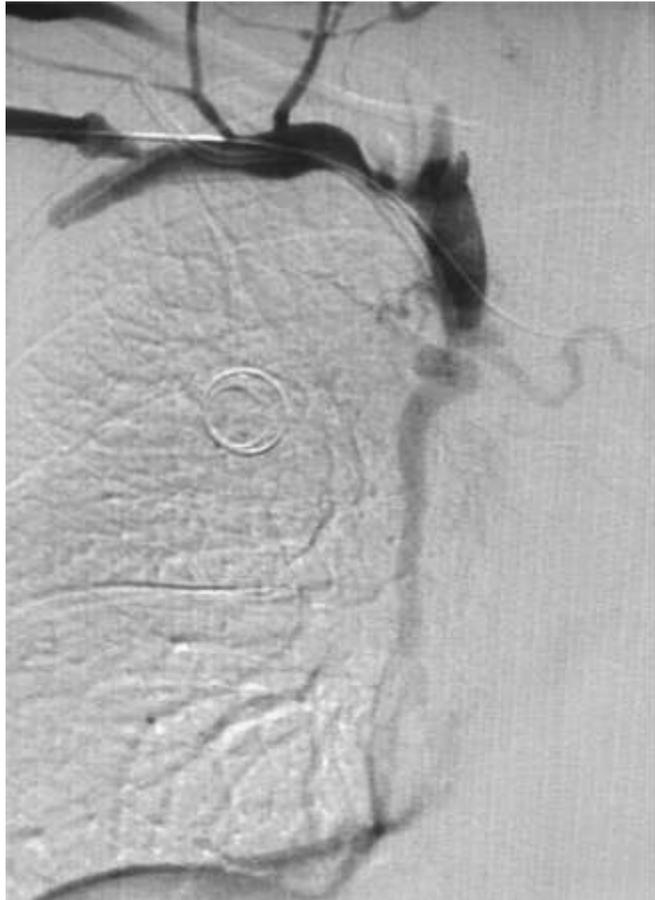


A novel technique to restore access in patients with central venous occlusion using the Surfacer[®] Inside-Out[®] Access Catheter System

Tarik R Baetens¹, Joris I Rotmans², Rutger W van der Meer¹ and Carla SP van Rijswijk¹



Le risque de **complication** !! **hémopéricarde** lors de l'angioplastie de la terminaison du TVBC ou du TVIG !!



Balloon Dilation of the Superior Vena Cava (SVC) Resulting in SVC Rupture and Pericardial Tamponade: A Case Report and Brief Review

Karen T. Brown, George I. Getrajdman

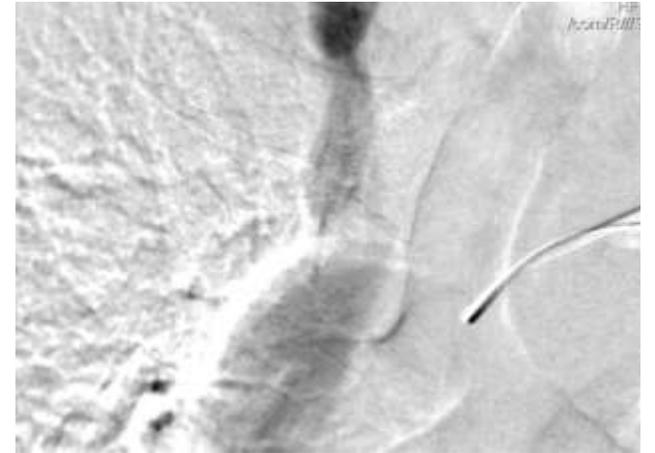
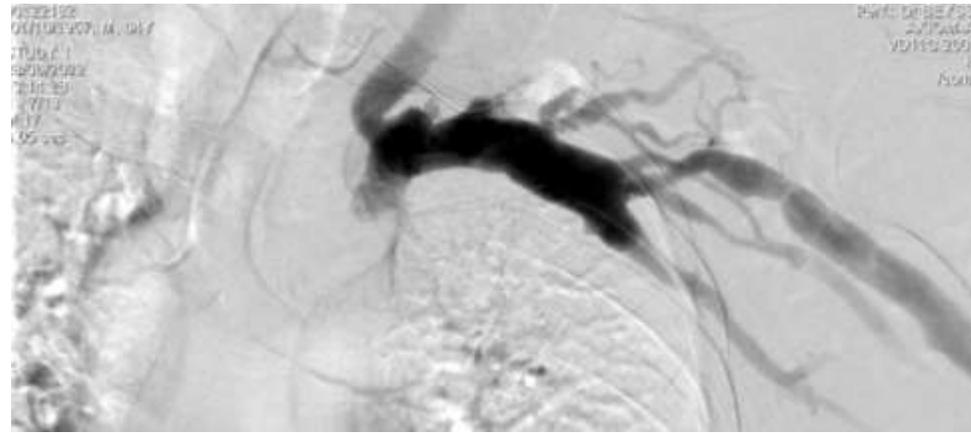
Department of Radiology, Memorial Sloan Kettering Cancer Center, 1275 York Avenue, New York, NY 10021, USA

Cardiovasc Intervent Radiol
DOI 10.1007/s00270-008-9443-0

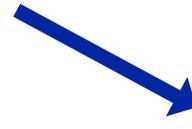
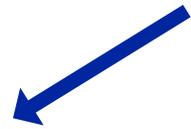
CASE REPORT

Fatal Pericardial Tamponade After Superior Vena Cava Stenting

Marieke J. M. Ploegmakers · Matthieu J. C. M. Rutten



Echec de recanalisation par voie haute



Réduction de débit ?

Tentative de recanalisation par voie fémorale ?



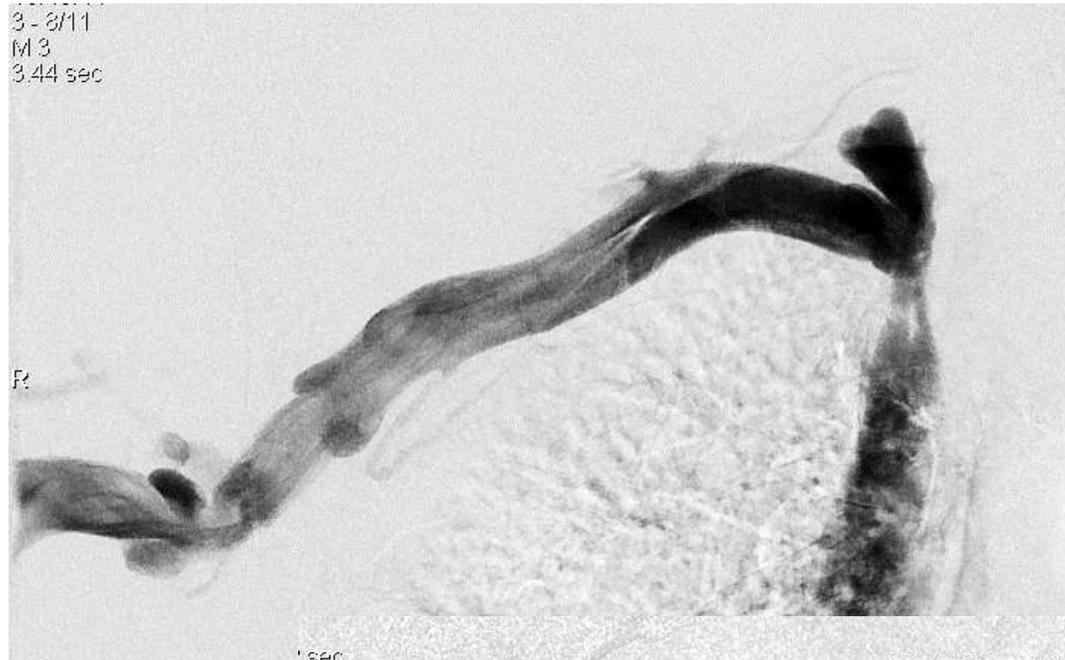
Patient dialysé sur un KT jugulaire droit

ED avant création d'un abord basilique droit

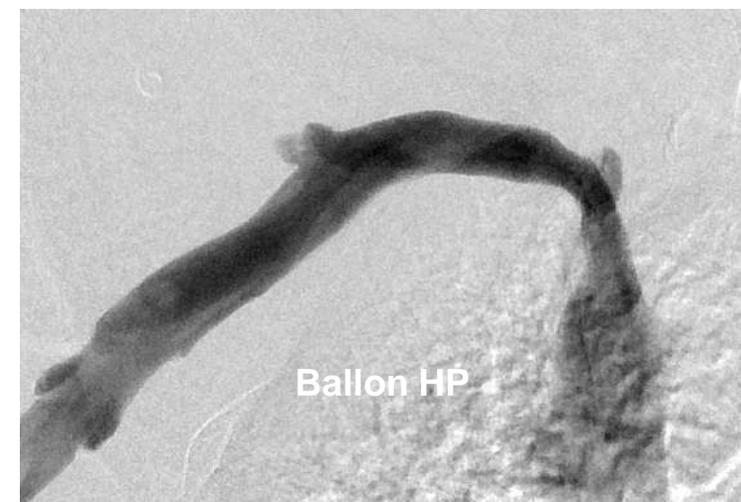
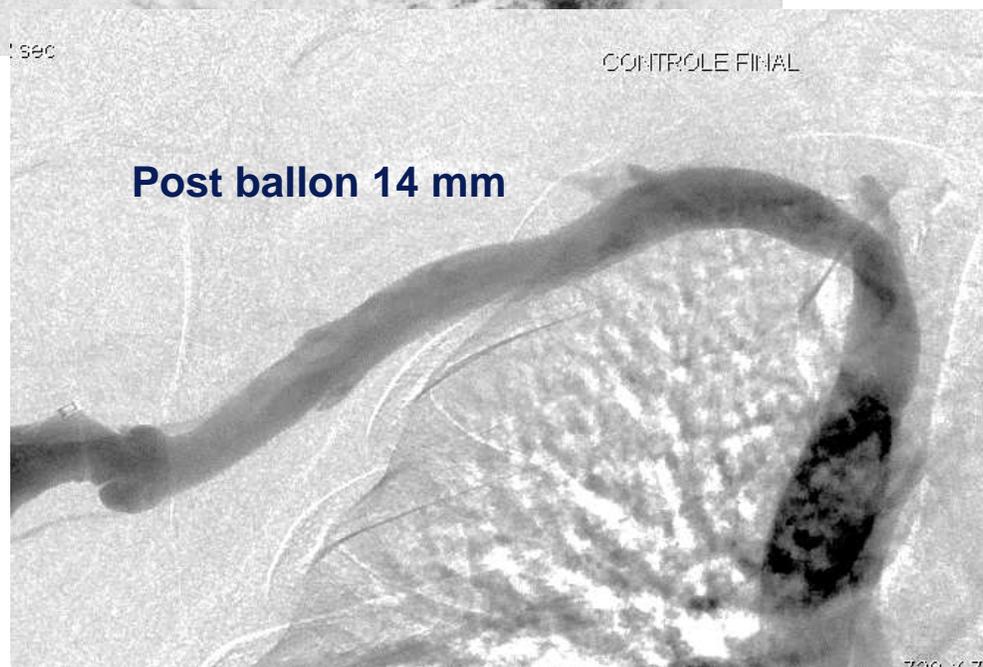
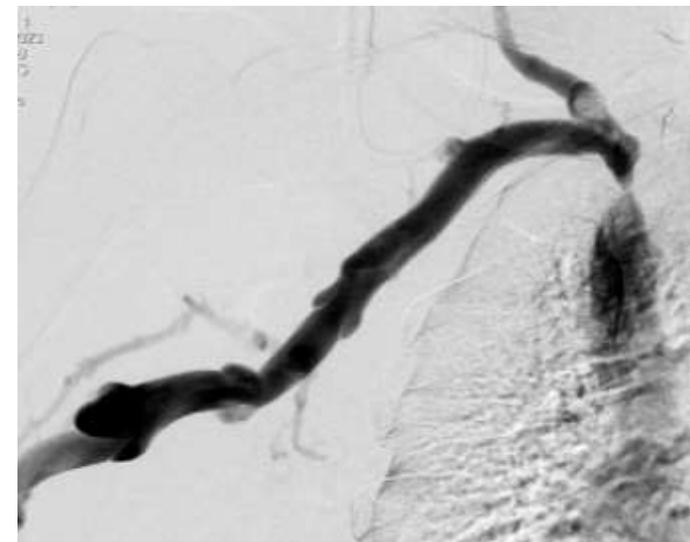
- *Axes veineux profonds perméables*
- *A Droite*
 - *Veine Céphalique Ante-Brachiale : Occlus*
 - *Veine Céphalique Brachiale : Occlus*
 - *Veine Basilique Brachiale : 6 mm*
 - *Veine Basilique Anté Brachiale : 4 mm*
- *A Gauche*
 - *Veine Céphalique Ante-Brachiale : Occlus*
 - *Veine Céphalique Brachiale : Occlus*
 - *Veine Basilique Brachiale : Occlus*
 - *Veine Basilique Anté Brachiale : Occlus*

Création d'un abord basilique droit le 28/09/2021 suivi d'une angioplastie de la veine juxta anastomotique pour abord immature





12 mois, réapparition d'un œdème de l'avant bras

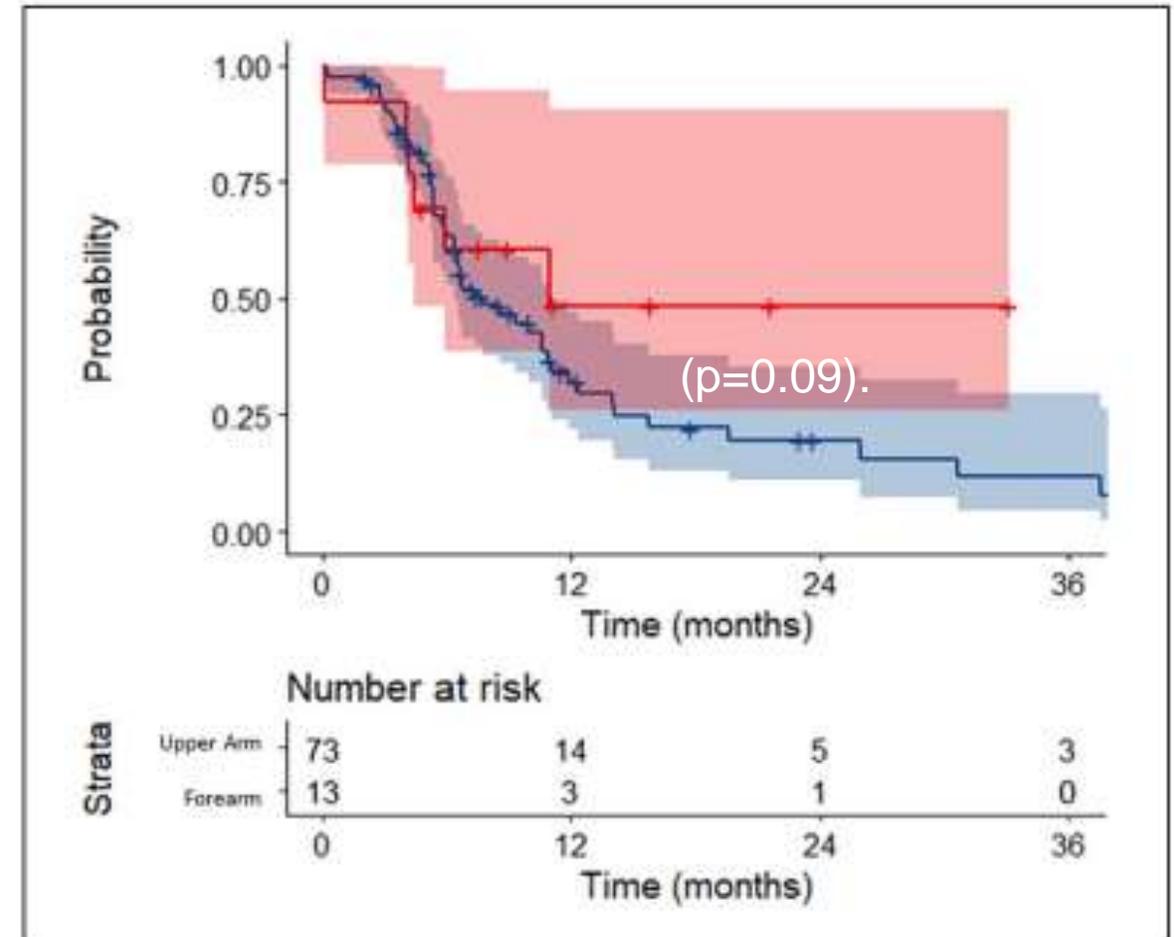


Paclitaxel-Coated Balloons for the Treatment of Symptomatic Central Venous Stenosis in Vascular Access: Results From a European, Multicenter, Single-Arm Retrospective Analysis

Panagiotis M. Kitrou, MD, MSc, PhD, EBIR, FCIRSE¹, Tobias Steinke, MD², Rami El Hage, MD³, Pedro Ponce, MD⁴, Pierleone Lucatelli, MD⁵, Konstantinos Katsanos, MD, MSc, PhD, EBIR¹, Stavros Spiliopoulos, MD, PhD, EBIR, FCIRSE⁶, Alessio Spinelli, MD⁷, Theodosios Bisdas, MD⁸, Konstantinos Stavroulakis, MD⁹, Ounali Jaffer, MD¹⁰, Alexandros Mallios, MD³, Simone Zilahi de Gyurgyokai, MD⁵, Roberto Cancellieri, MD⁵, Raphael Coscas, MD¹¹, and Dimitrios Karnabatidis, MD, PhD, EBIR, FCIRSE¹

Diamètre médian des ballons actifs 10 mm (8–12 mm)

- Perméabilité 1aire à 6 mois : 62,7 %
- Perméabilité circuit à 6 mois : 87,7 %
- Patients en vie à 2 ans : 79,7 %



Increased balloon size had a significant effect on patency rates !!

Paclitaxel-Coated Balloon Angioplasty for Early Restenosis of Central Veins in Hemodialysis Patients: A Single Center Initial Experience

Keerati Hongsakul, MD¹, Kittipitch Bannangkoon, MD¹, Sorracha Rookkapan, MD¹, Ussanee Boonsrirat, MD², Boonprasit Kritpracha, MD³

¹Division of Interventional Radiology, Department of Radiology, ²Division of Nephrology, Department of Internal Medicine, and ³Division of Vascular Surgery, Department of Surgery, Faculty of Medicine, Prince of Songkla University, Hat Yai 90110, Thailand

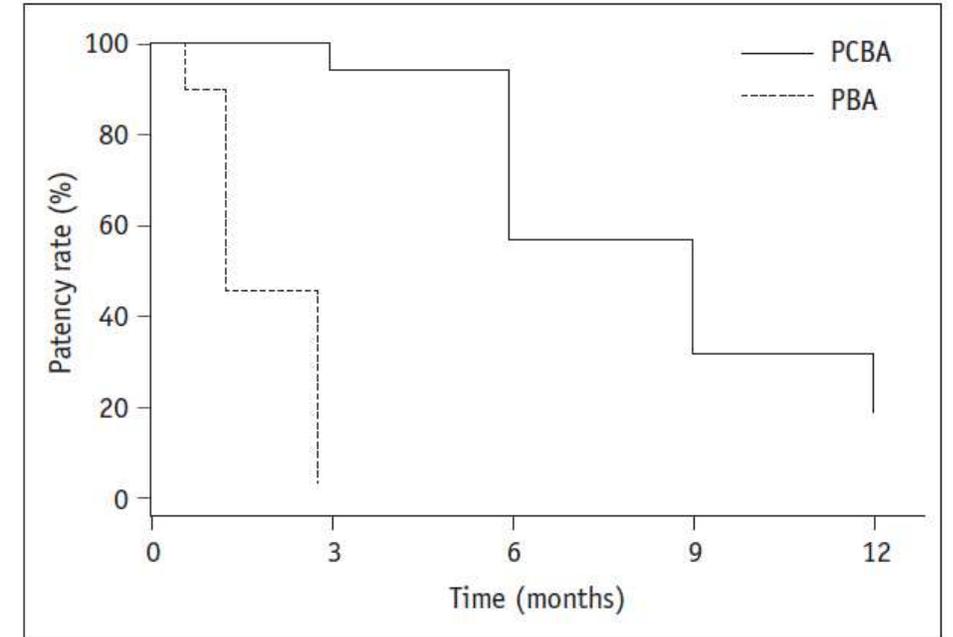
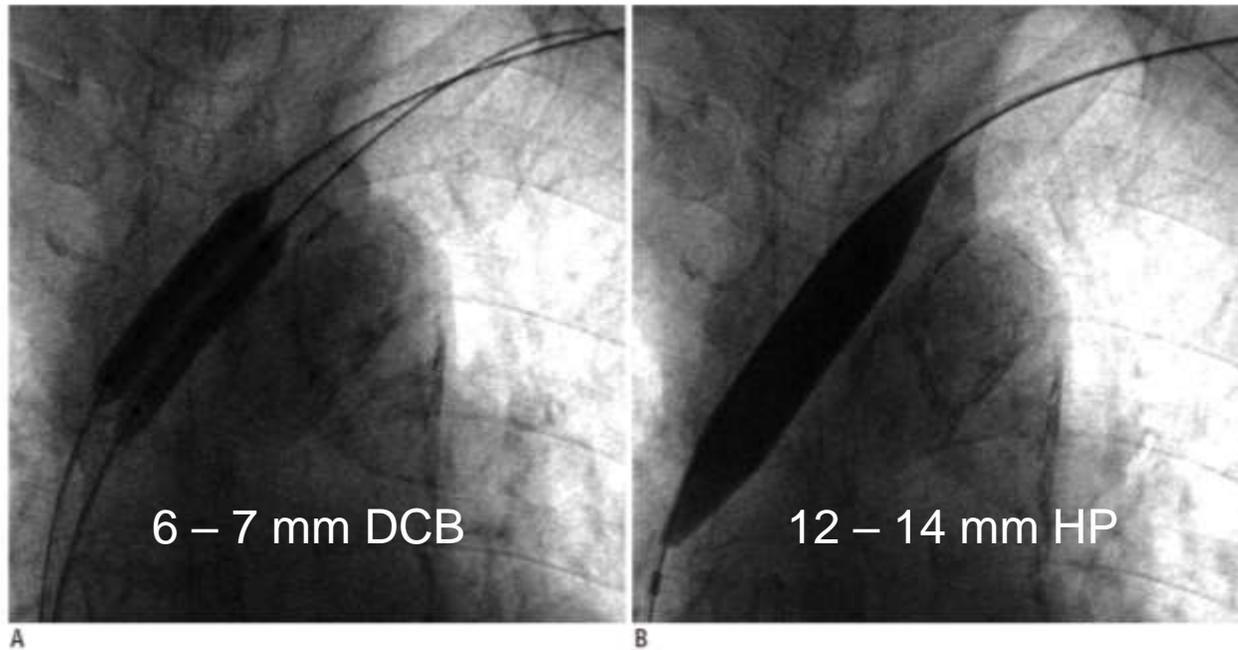
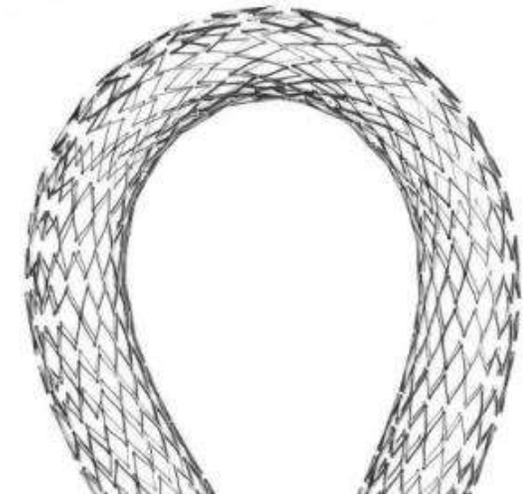
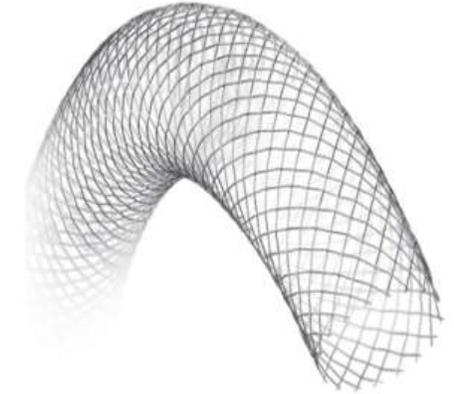


Fig. 5. Kaplan-Meier curve comparing primary patency between historical data after last PBA and PCBA in same patients.

Median patency times for PBA and PCBA were 2.5 months and 9 months, respectively ($p < 0.001$)

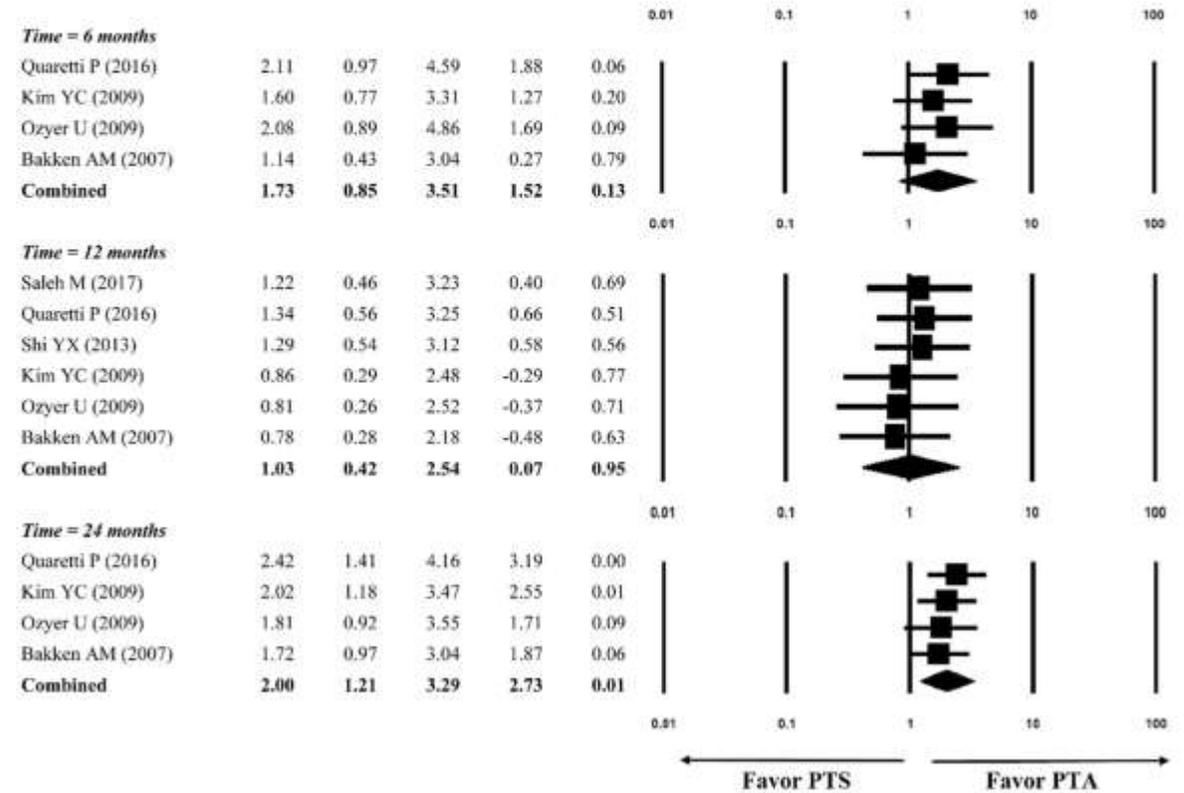
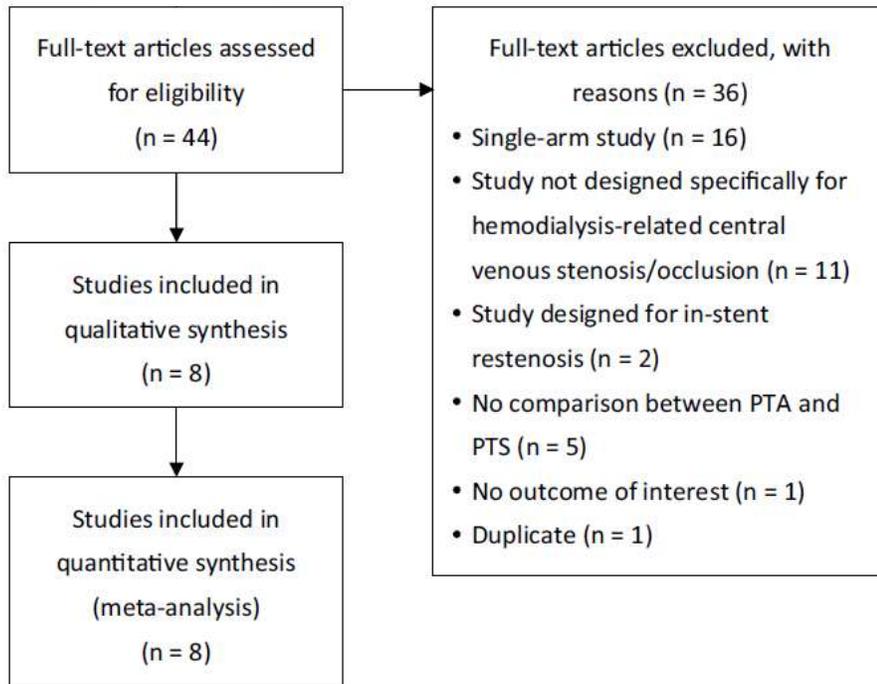
Implantation d'un stent

- **Indications :**
 - Sténose résiduelle sans modification de la collatéralité ++
 - Resténose itérative à intervalle court (< 3 mois ?)
- **Vigilance extrême afin de préserver les confluences :**
 - Jugulaire si elle est perméable avec un stent couvert
 - **TVBC ou TVI controlatéral ++**
- **Que faire en cas d'occlusion avec un KT de dialyse ou un PAC ?**
 - **Ne pas les retirer avant d'avoir franchi l'occlusion ++**
 - Retrait et repose ou déplacement puis repositionnement ... lasso ?
- **Que faire en cas de sondes de Pace Maker ?**
 - A priori contre indication (risque infectieux, ...) à un stent
 - A discuter en impasse thérapeutique chez un patient âgé



Comparison of Percutaneous Transluminal Angioplasty with Stenting for Treatment of Central Venous Stenosis or Occlusion in Hemodialysis Patients: A Systematic Review and Meta-analysis

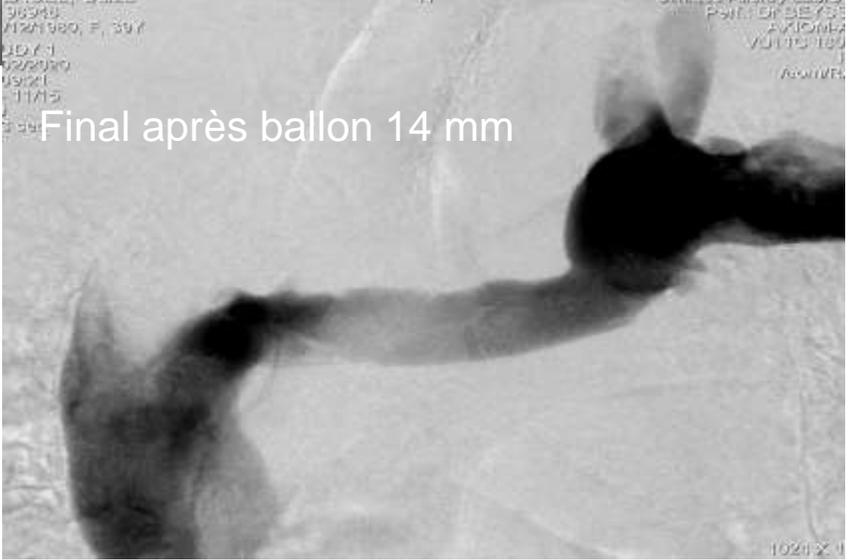
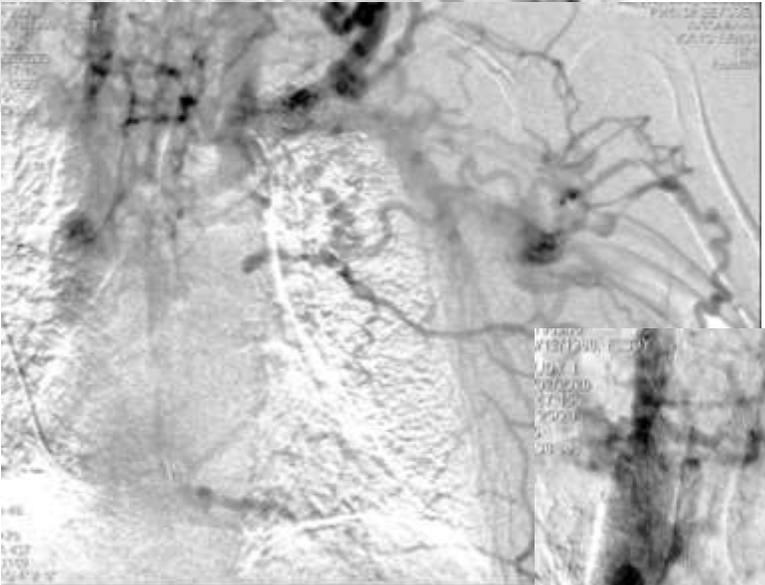
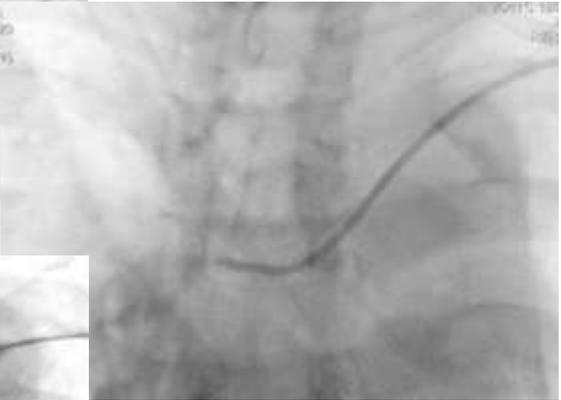
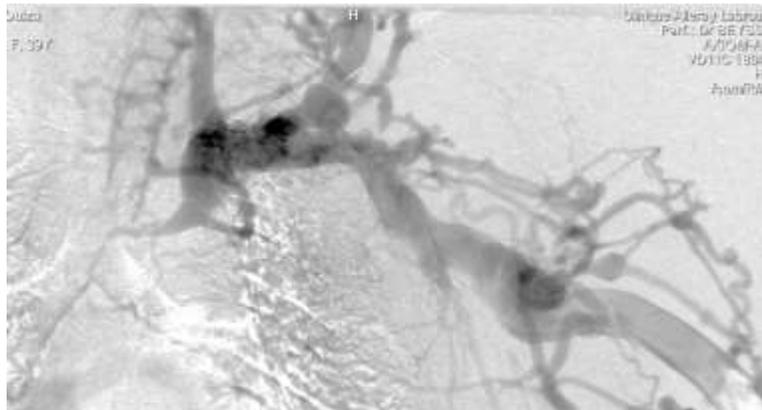
Tien-Yu Wu¹ · Chung-Kuan Wu^{2,4} · Yen-Yang Chen³ · Chia-Hsun Lin^{3,4}



Conclusions

The present meta-analysis revealed that, compared to PTS, PTA may provide increased assisted primary patency for endovascular treatment of central vein stenosis or occlusion.

Level of Evidence Level 3a.



47 ans double greffe rénale (pas de possibilité d'une 3^{ème} transplantation)

Abord huméro céphalique gauche avec banding en 2015

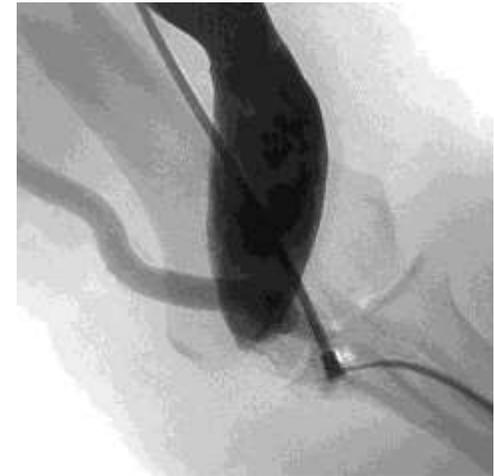
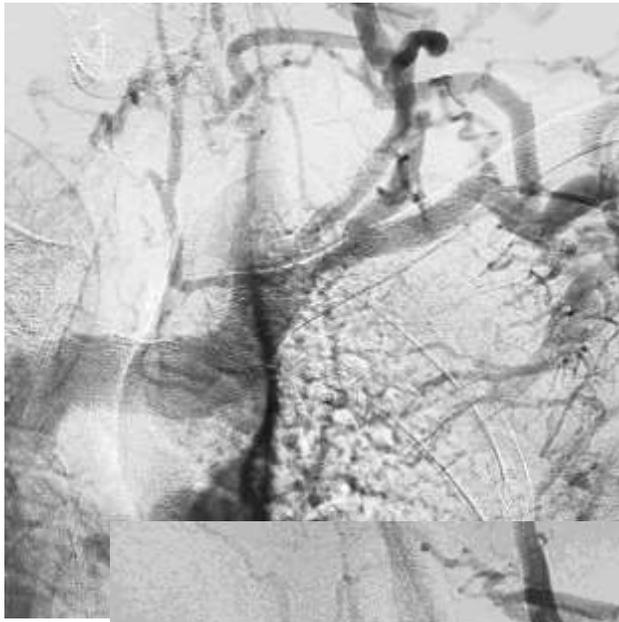
Occlusion chronique de la veine sous clavière

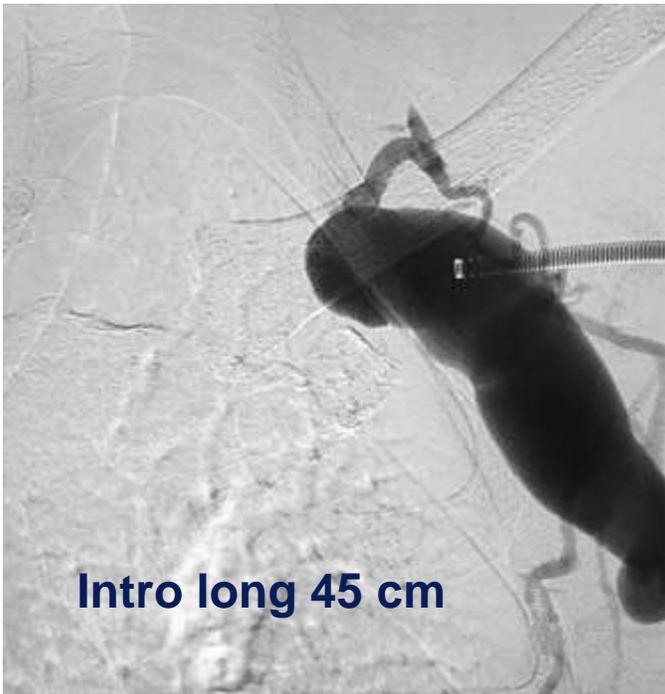
Echec de recanalisation il y a 6 mois

Œdème chronique invalidant du bras

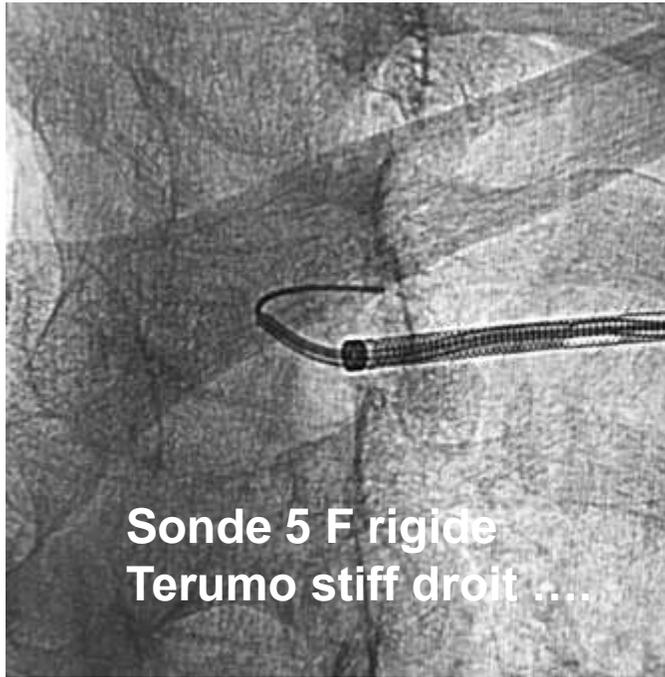


« Une nouvelle réduction du débit ne parait pas envisageable en raison d'un gros risque de thrombose post opératoire à cause de l'occlusion du drainage central »



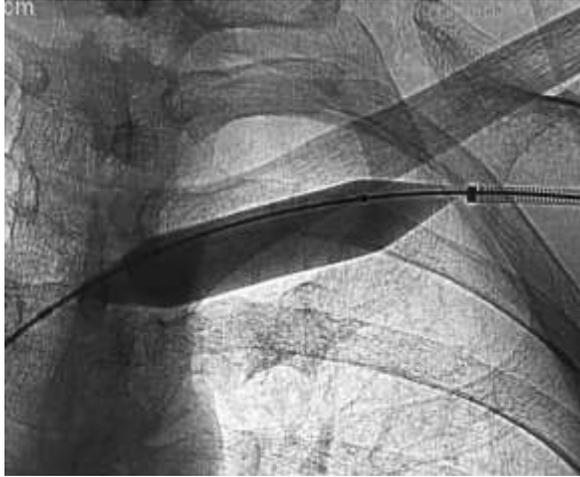


Intro long 45 cm

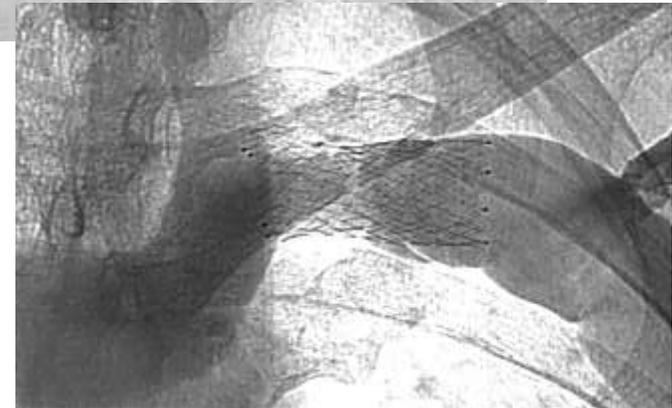
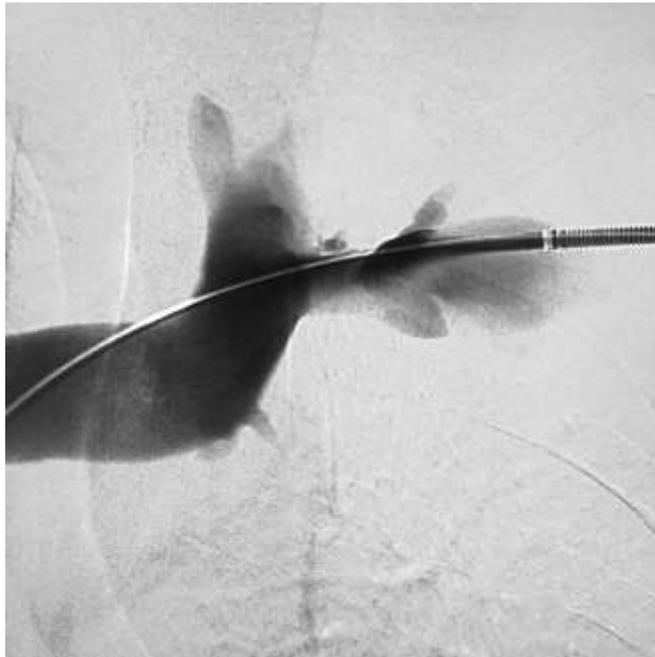


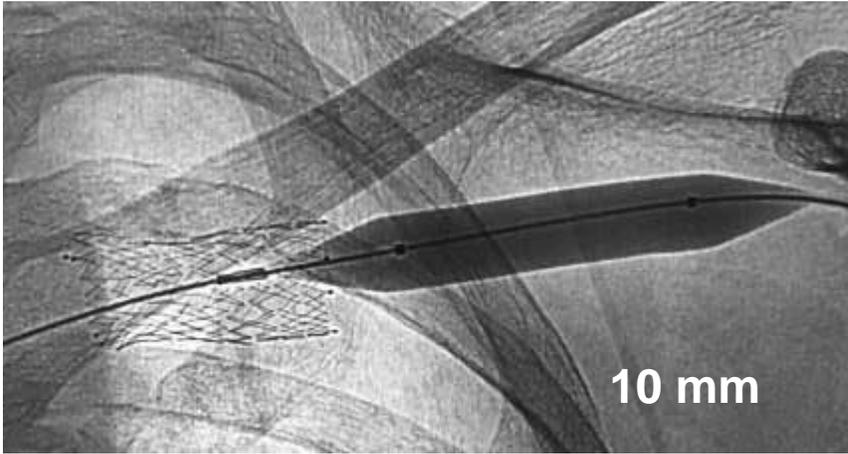
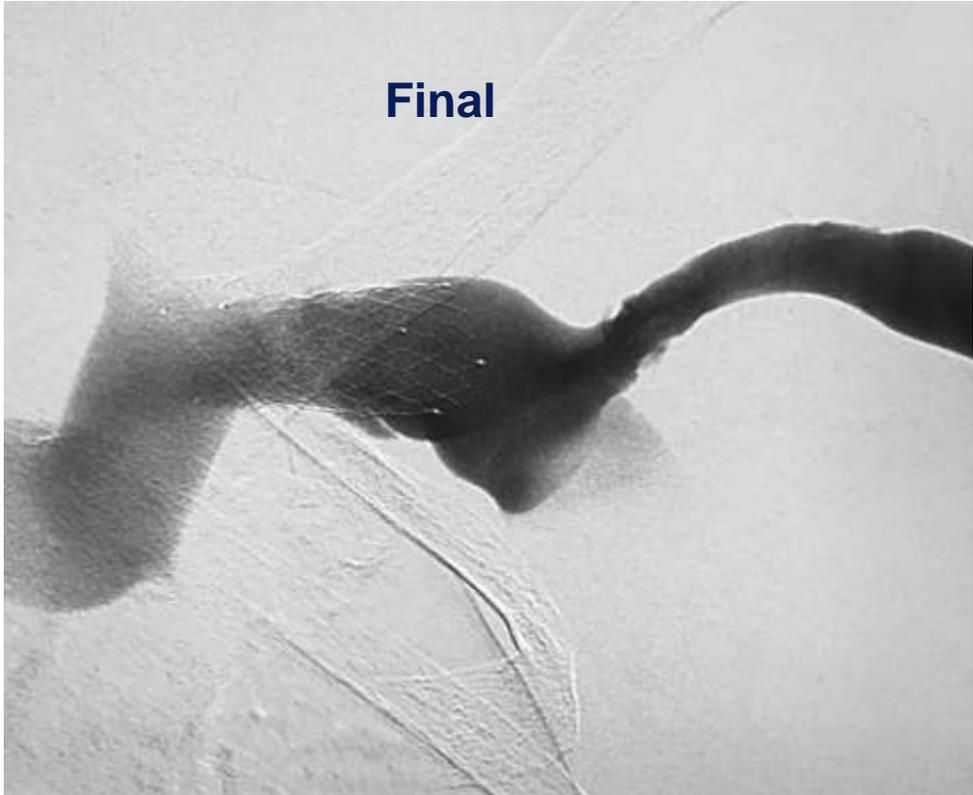
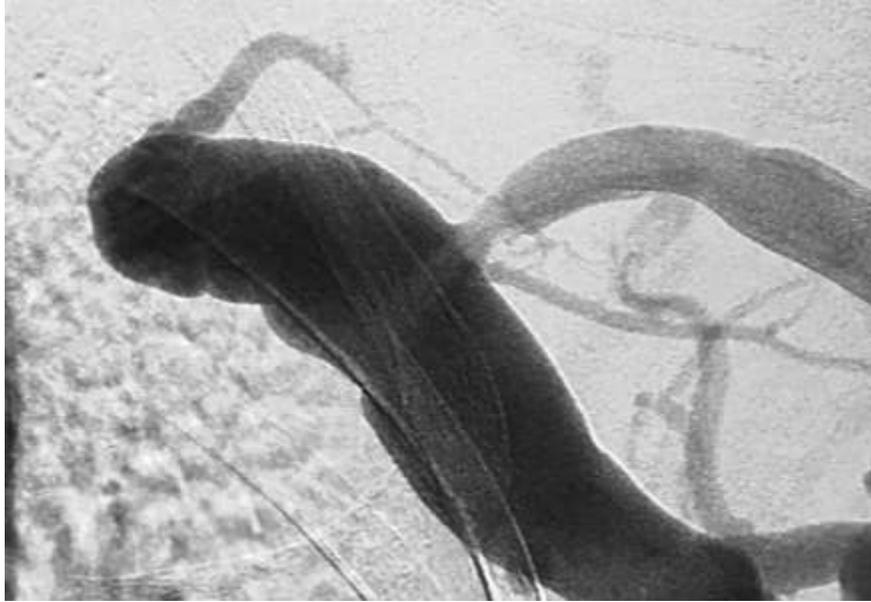
Sonde 5 F rigide
Terumo stiff droit





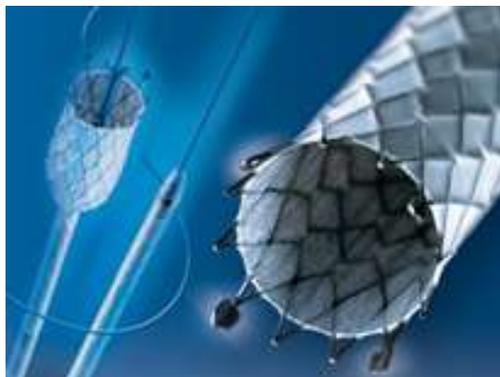
Stent ?





Stent Grafts for Central Venous Occlusive Disease in Patients with Ipsilateral Hemodialysis Access

Anthony G. Verstandig, MB, BS, Daniel Berelowitz, MB, BChir, Ibrahim Zaghal, MD, Ilya Goldin, MD, Oded Olsha, MB, BS, Bashar Shamieh, MD, Vladimir Shraibman, MD, and David Shemesh, MD



52 patients *symptomatiques consécutifs*

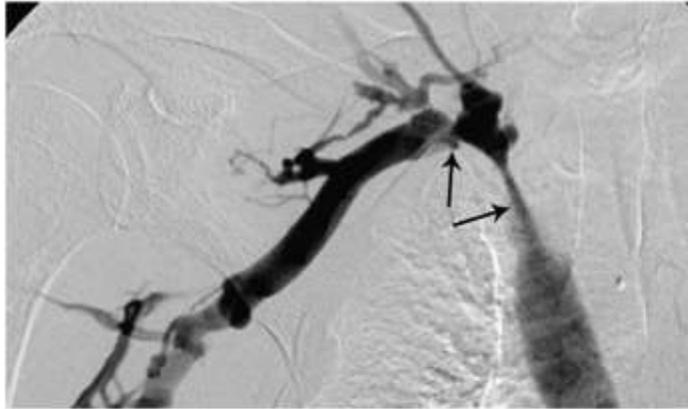
Table 3. Number of Interventions before Stent Graft Insertion

No. Interventions	No. Patients
0	8
1	7
2	7
3	11
4	4
5	4
> 5	11

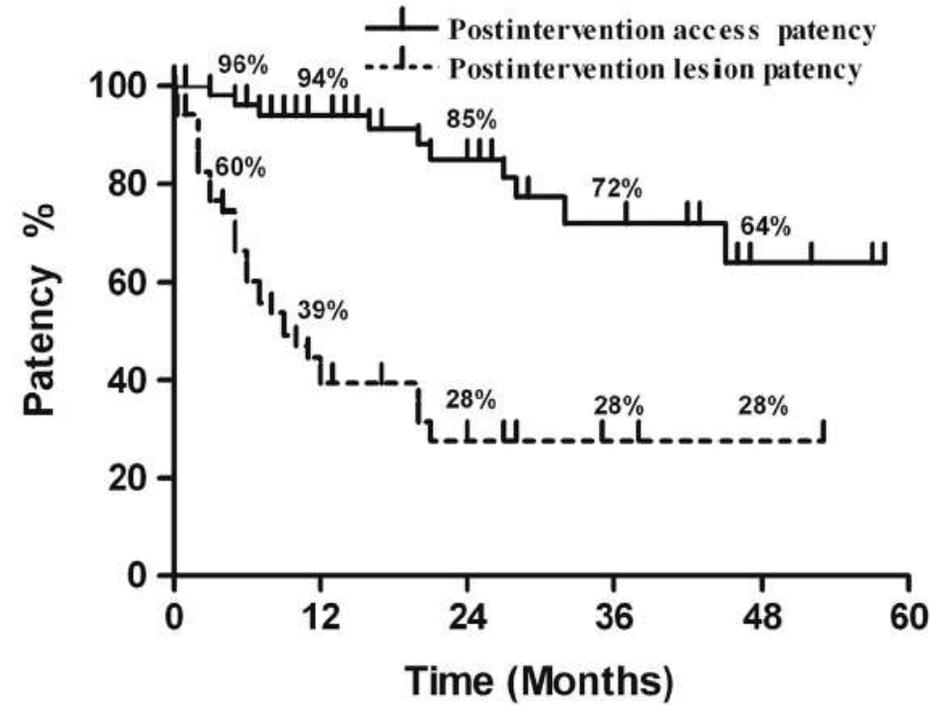
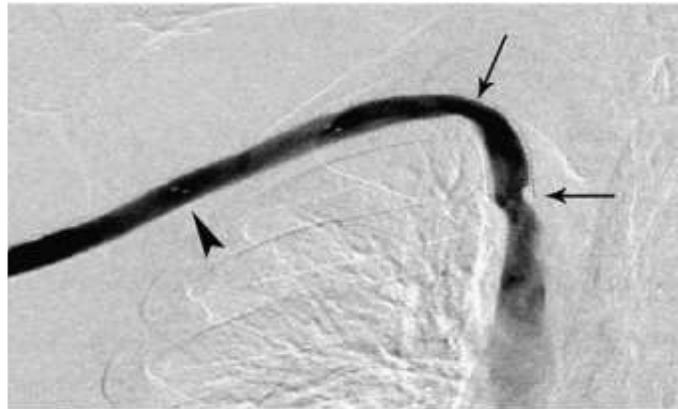
Previous PTA and bare metal stent insertion procedures (median = 3 per patient).

J Vasc Interv Radiol 2013; 24:1280–1287

No. Patients	52
Male/female	31/21
Mean age (y)	68.2 (range, 32–87)
Indication for stent graft*	
Elastic recoil	29
Rapid recurrence	20
Occlusion at presentation	10
Not recorded	4

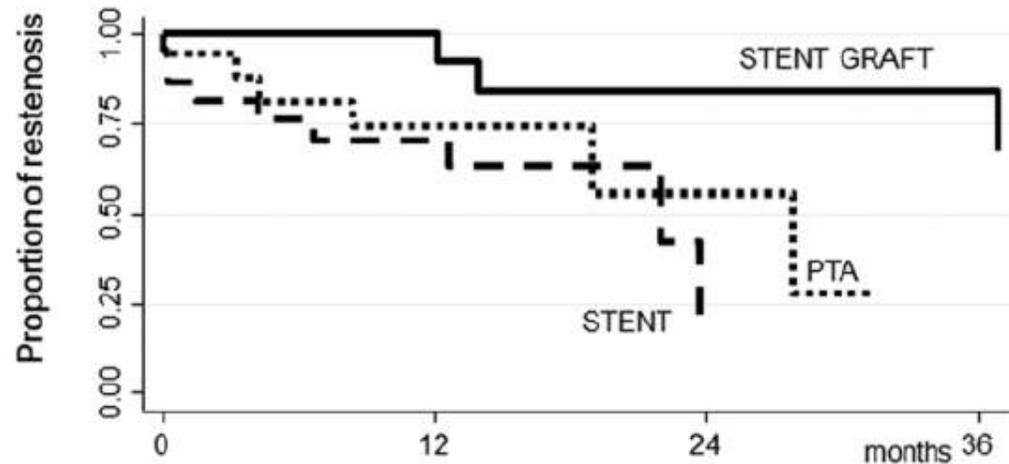


Couverture
jugulaire interne
dans 77 % des cas

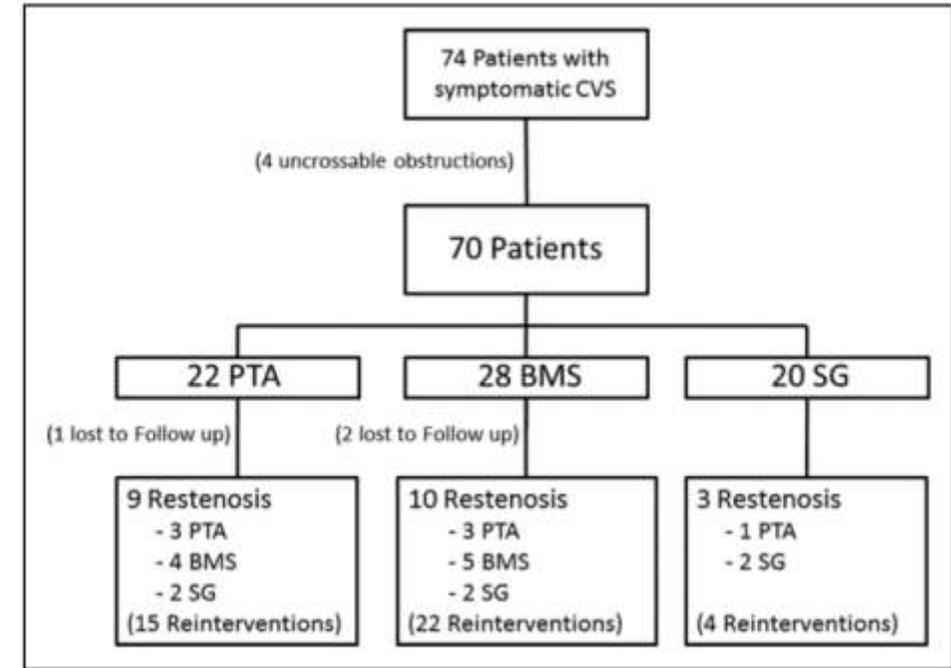


Stent Grafts Provided Superior Primary Patency for Central Venous Stenosis Treatment in Comparison with Angioplasty and Bare Metal Stent: A Retrospective Single Center Study on 70 Hemodialysis Patients

Pietro Quaretti, MD¹, Franco Galli, MD², Lorenzo Paolo Moramarco, MD¹, Riccardo Corti, MD³, Giovanni Leati, MD³, Ilaria Fiorina, MD³, Carmine Tinelli, MD⁴, Giovanni Montagna, MD², and Marcello Maestri, MD⁵



Pts at risk	0	12	24	36
PTA	18	5	3	0
BMS	22	10	1	1
SG	20	13	8	5



BMS	Stent Graft
Express (5), Wave Max (4). Wallstent (18), Luminexx (9), Smart (7).	Advanta (3), Jostent (1). Fluency (7), Viabahn (18), Viatorr (3), Hemobahn (1).
Memotherm (14), Sinus XI (1).	

Stent-Graft Length Is Associated with Decreased Patency in Treatment of Central Venous Stenosis in Hemodialysis Patients

Mina L. Boutros,¹ Alejandro C. Alvarez,² Obi T. Okoye,¹ Jennifer C. Laws,¹ Donald L. Jacobs,¹ and Matthew R. Smeds,¹ Saint Louis, Missouri

Table V. Primary and secondary patency rates of deployed stent grafts

	6 months	12 months	24 months
Primary patency rate	92.9%	91.7%	80.0%
Secondary patency rate	96.4%	95.8%	93.3%

Table II. Site of covered stent-graft deployment

Site of stents	n = 29
Right subclavian vein	2 (6.9%)
Right subclavian and right brachiocephalic vein	6 (20.7%)
Right brachiocephalic vein	8 (27.6%)
Left subclavian vein	6 (20.7%)
Left subclavian and left brachiocephalic vein	2 (6.9%)
Left brachiocephalic vein	3 (10.3%)
Left cephalic and left subclavian vein	1 (3.4%)
Left cephalic arch	1 (3.4%)

Table III. Relationship between stent length and episodes of primary occlusion

Stent length, mm (N)	Percentage occlusion
25 (2)	0% (0/2)
50 (24)	8.3% (2/24)
60 (1)	0% (1/1)
75 (1)	100% (1/1)
100 (1)	100% (1/1)

Management of Central Venous Stenoses and Occlusions

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Abstract Symptomatic central venous stenosis and occlusion remains the gordian knot of vascular access. Advances in techniques, like sharp recanalization, allowed for improved success rates in crossing these difficult lesions. There is also increasing evidence of new devices in treating central venous stenosis and, at the same time, improving the time needed between interventions. High-pressure balloons, paclitaxel-coated balloons, bare metal stents and covered stents have been tested with an aim to offer additional treatment options, although obstacles still exist. In the current review, authors describe relevant techniques and options, provide the evidence and evaluate the actual implementation of these devices in this demanding field.