

Plan de la présentation

- Retour d'expérience à propos de 37 cas.
- Aspects techniques.
- Points critiques pour sécuriser les suites : que dit la littérature?
- Illustrations de cas complexes.

Qu’est ce qu’un AAA complexe ?

SOCIETY FOR VASCULAR SURGERY REPORTING STANDARDS

Check for updates

Reporting standards for endovascular aortic repair of aneurysms involving the renal-mesenteric arteries

Gustavo S. Oderich, MD (Chair),[a] Thomas L. Forbes, MD (Co-Chair),[b] Rabih Chaer, MD,[c] Mark G. Davies, MD, PhD, MBA,[d] Thomas F. Lindsay, MD,[b] Tara Mastracci, MD,[e] Michael J. Singh, MD,[c] Carlos Timaran, MD,[f] and Edward Y. Woo, MD,[g] Writing Committee Group, *Houston, San Antonio, and Dallas, Tex; Toronto, Ontario, Canada; Pittsburgh, Pa; London, United Kingdom; and Washington, D.C.*

ABSTRACT

Endovascular aortic aneurysm repair of complex aortic aneurysms requires incorporation of side branches using specially designed aortic stent grafts with fenestrations, directional branches, or parallel stent grafts. These techniques have been increasingly used and reported in the literature. The purpose of this document is to clarify and to update terminology, classification systems, measurement techniques, and end point definitions that are recommended for reports dealing with endovascular repair of complex abdominal and thoracoabdominal aortic aneurysms involving the renal and mesenteric arteries. (J Vasc Surg 2021;73:4S-52S.)

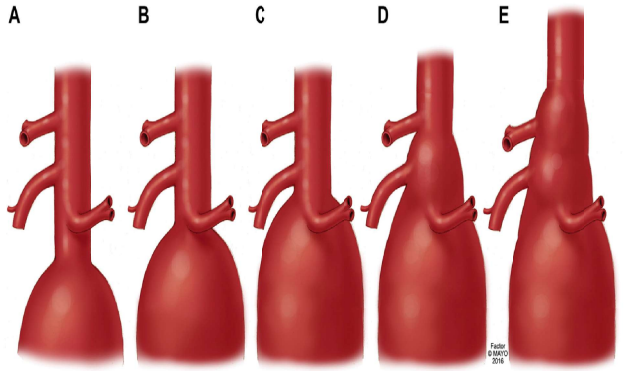


Fig 10. Classification of abdominal aortic aneurysms (AAAs) including short-neck (<10 mm) infrarenal **(A)**, juxtarenal **(B)**, pararenal **(C)**, paravisceral **(D)**, and extent IV thoracoabdominal aortic aneurysm (TAAA; **E**). (Reproduced by permission of Mayo Foundation for Medical Education and Research. All rights reserved.)

Matériel et méthodes

- Notre série :
  - 37 patients: Janvier 2020 à Juillet 2026.
  - 32 H et 05 F.

	Nombre	Pourcentage, ou écart type
Age	71,6	59-82
Sexe	5F	
Tabac	29	78 %
Diabète	6	16 %
HTA	29	78 %
Dyslipidémie	28	75 %
Coronaropathie	13	35 %
IRC : DFG <60	10	27 %
BPCO	12	32 %
Anti coag	7	19 %
Rein unique	**3**	**2 stentés**

Diamétre anévrismal	60,8 (45 - 120)
Voie d'abord	7 Médianes 30 Retro
Thoraco phreno lobotomie	7
Clampage supra renal	30
Clampage supra mésentérique	5
Clampage inter rénal	2
Nephroplégie	33
Endaterectomie aortique	4
Pontage artère rénale gauche	12

Indications de chirurgie ouverte ?

- **23 patients avaient le choix :**

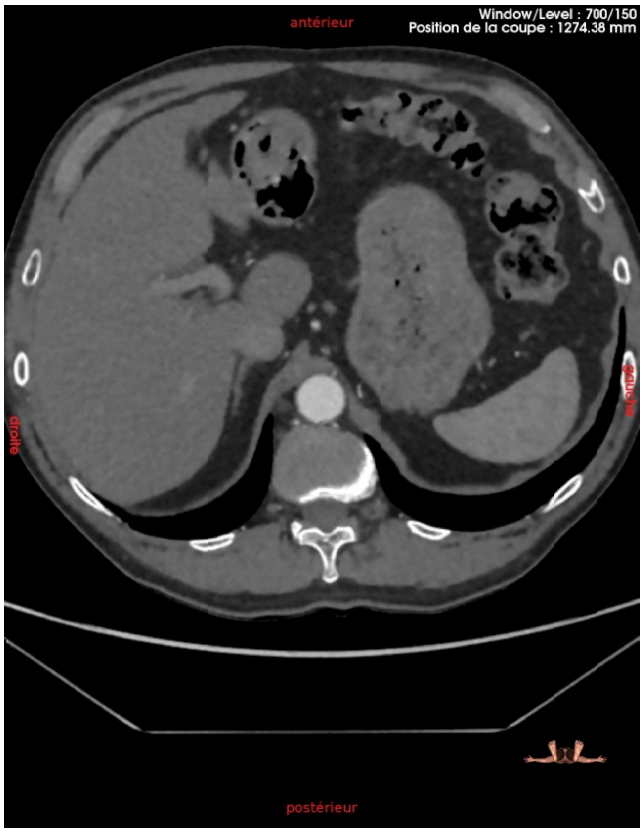
Décision médicale partagée : information complète comparative Open Vs Endo .

- **14 patients la chirurgie était l'unique option** : à cause de ***contraintes anatomiques.***

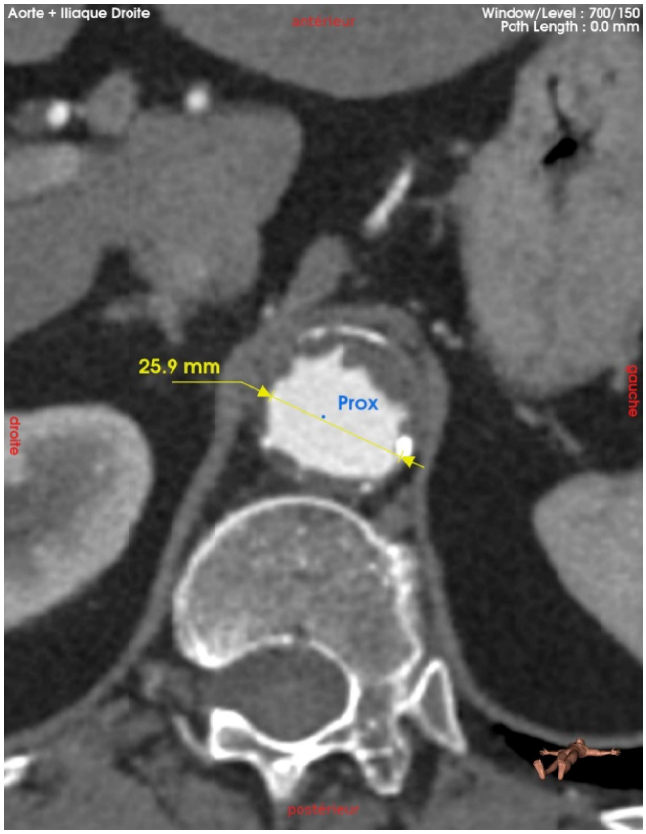
- Indication validée après bilan d'opérabilité (cardio, pneumo, TSA, optimisation nutritionnelle)

Indications d'ordre **anatomique de la chirurgie ouverte**	14
Artères polaires bilatérales	4
Endofuite sur EVAR	3
Coral Reef	2
Stent rénal sur rein unique	2
Iliaques communes courtes < 25 mm	1
Tortuosité aorte viscérale	2

- Coral Reef et anévrisme de l’aorte abdominale



- Stent renal sur rein unique, et artériopathie digestive.

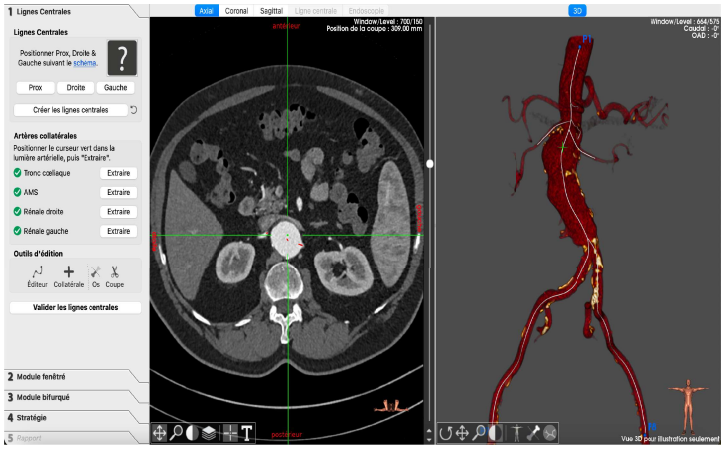


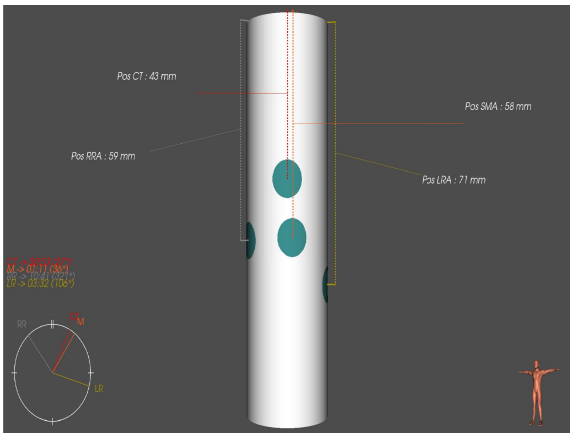
Tortuosité de l’aorte viscérale



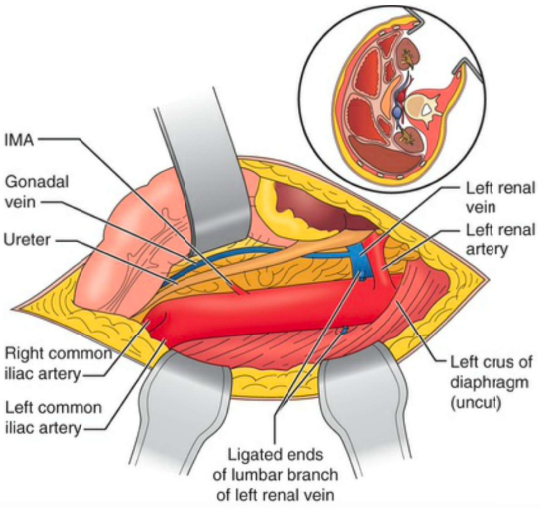


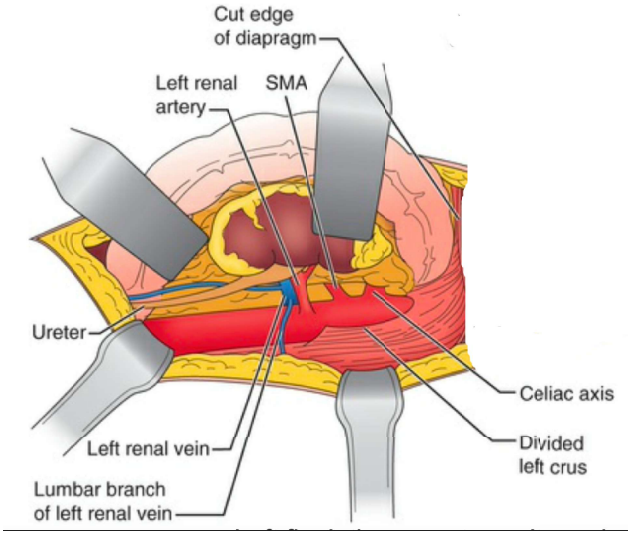
Planification pré opératoire





Voie d’abord

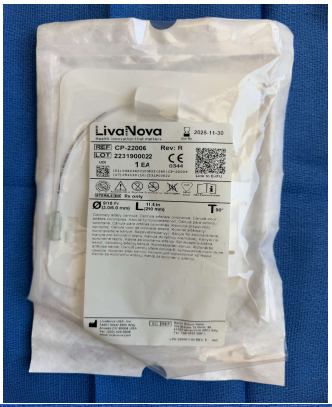


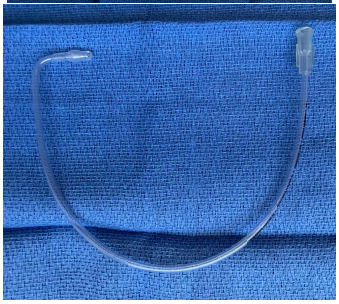


Néphroprotection : Néphroplégie?







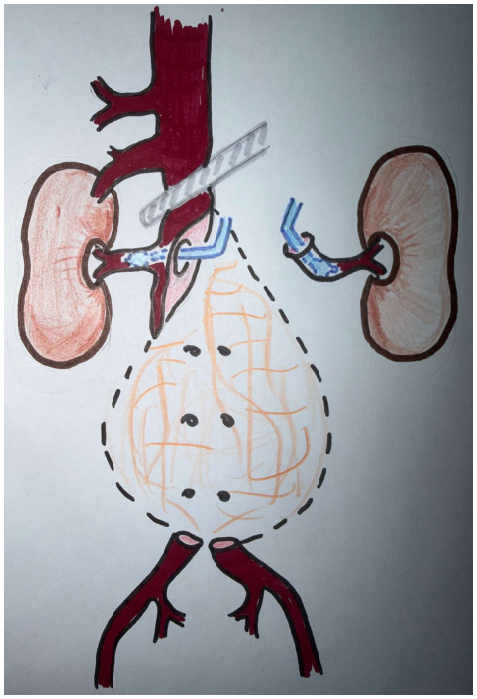


AAA Juxta rénal



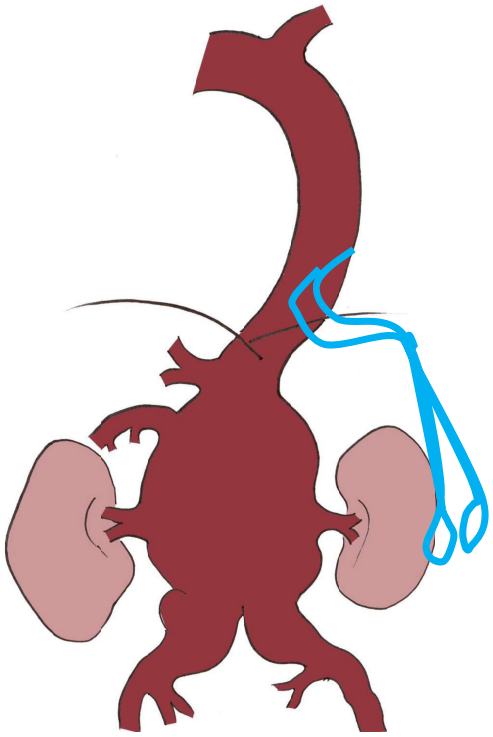


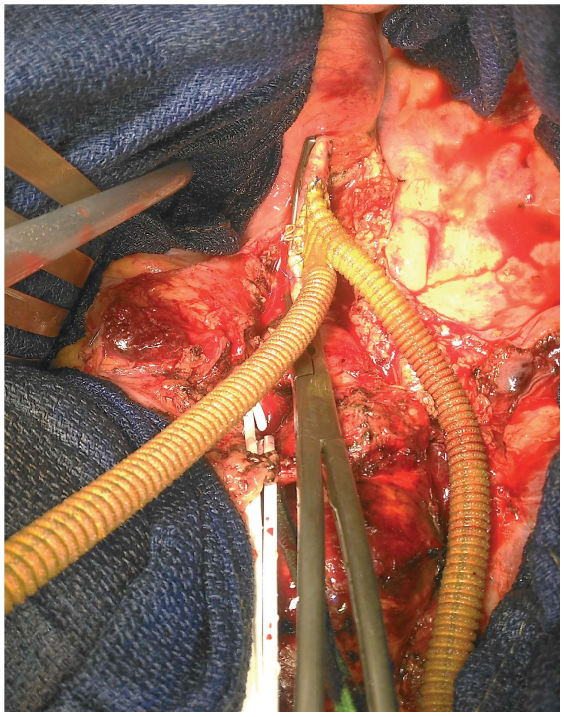
AAA Para rénal

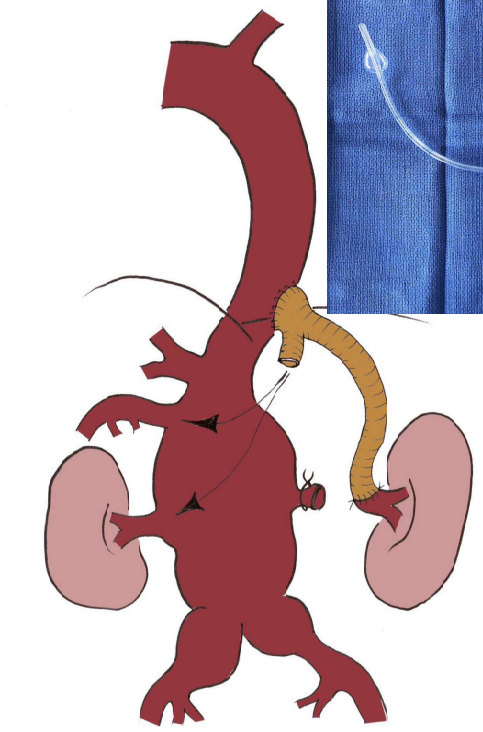


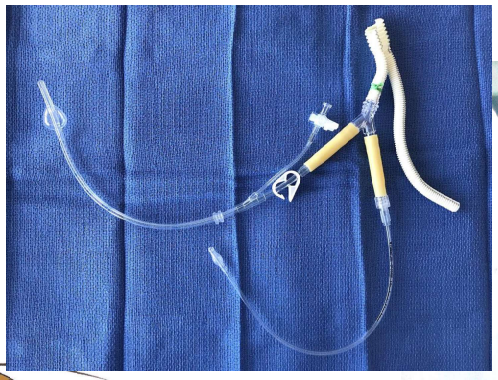


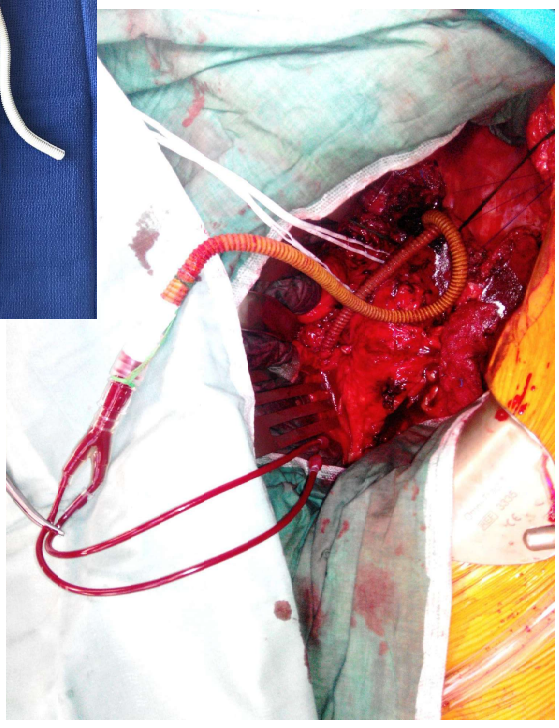
Néphroprotection : Shunt passif?

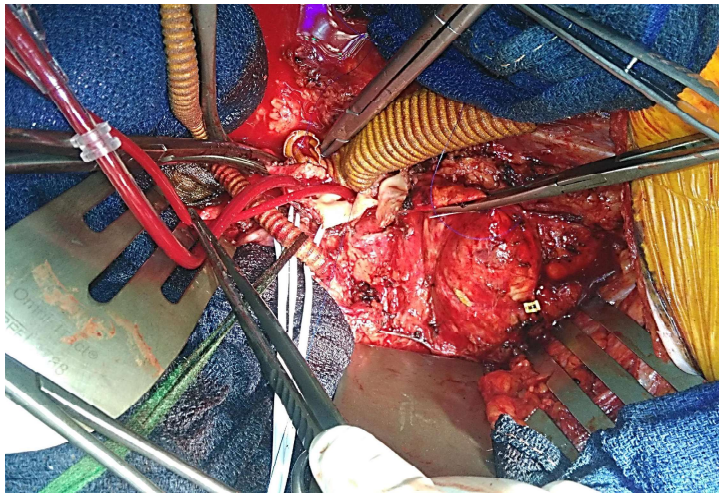


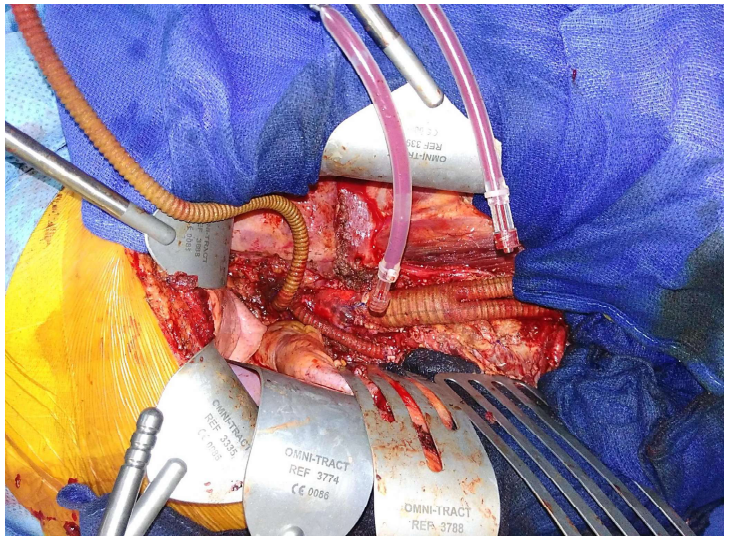


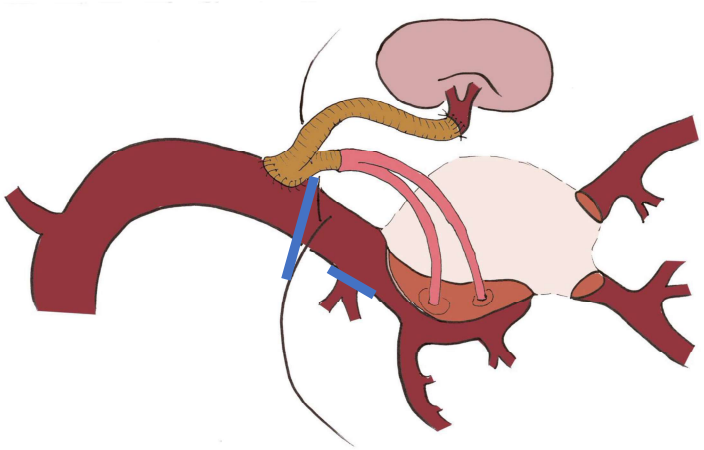


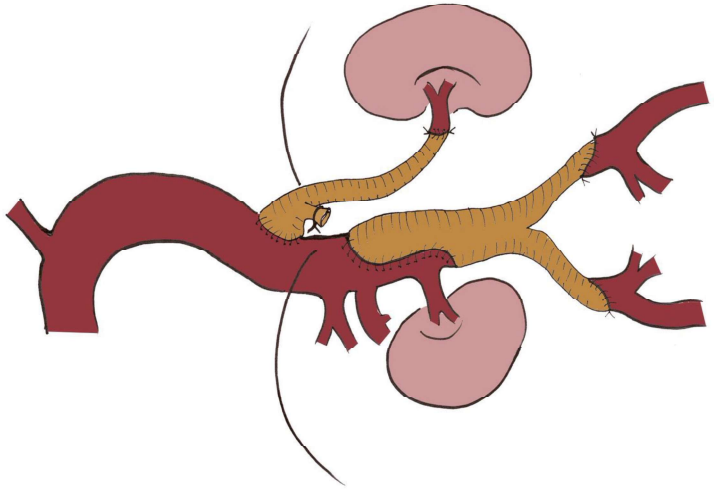


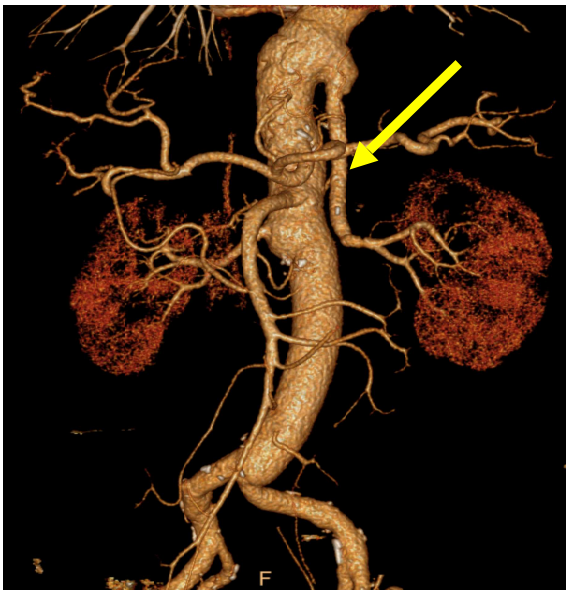


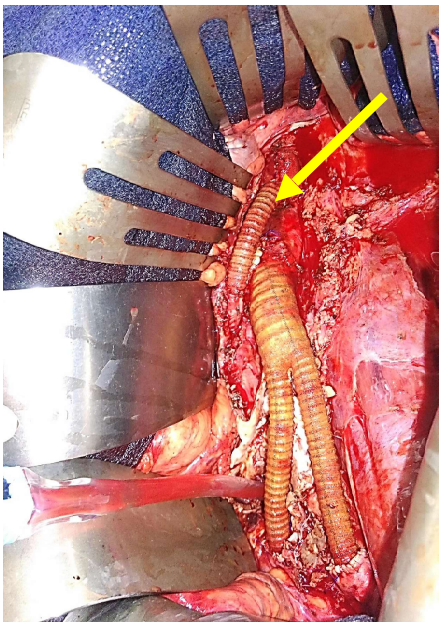



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JVS Journal of Vascular Surgery SVS Society for Vascular Surgery

CLINICAL RESEARCH STUDY | THORACOABDOMINAL AND COMPLEX AORTIC ANEURYSMS · Volume 80, Issue 6, P1668-1675, December 2024 · *Open Access* Download Full Issue

Elective open repair with the debranch, perfuse, reconstruct technique to treat suprarenal or type IV thoracoabdominal aortic aneurysms

Thibaud Hamelin, MD [a] · Zakariyae Bouziane, MD [a] · Nicla Settembre, MD, PhD [a,b] · Sergueï Malikov, MD, PhD [a,b]

Affiliations & Notes Article Info

Résultats

Complications	N (%)
Durée de séjour aux SI.	13 (4-23jours)
Cardiaques	0 (0)
Pulmonaires	8 (24)
Rénales (KDIGO 1)	25 (67)
Rénales (KDIGO2)	12 (32)
Rénales (KDFIGO 3 ou Dialyse	0 (0)
Intestinales viscérales	1 (2,7)
HRP	4 (11)
DMV	0 (0)
Paraplégie	0 (0)
ischémie MI	3 (8)
Décès	1 (2,7)

Stade dysfonction rénale aigüe (AKI – Acute Kidney Injury)		
	Créatinine	Débit Urinaire
Stade 1	X 1,5-1,9 dans les 7 j ou + 0,3 en 48h	< 0,5 ml/Kg/h en 6h
Stade 2	X 2-2,9 dans les 7 j	< 0,5 ml/Kg/h en 12h
Stade 3	X 3 dans les 7 j, ou > 4 mg/dL ou + 0,5 si créa > 4 mg/dl à la base	< 0,3 ml/Kg/h en 24h ou anurie de 12h

Classification KDIGO de l'IRA

Résultats littérature

Tableau 1

France	French multicentre study	315	JAAA	1 %
FEORA	10 high-volume European centres	315	J/PAAA	1 %
Germany	Specialist complex-AAA series	119	J/PAAA/paravisceral/type IV	2 %
Italy	Italian single-centre study	118	cAAA / JAAA / short neck	3 %
Sweden	Swedvasc nationwide	228	JAAA	3 %
Switzerland	Swissvasc national registry	333	JAAA + suprarenal AAA	3 %
Netherlands	Dutch Surgical Aneurysm Audit	258	JAAA	7 %
USA	VQI	large	JAAA	2.1–6.5%*

Points clés: que dit la littérature?

La voie d'abord : médiane Vs retro?



From the New England Society for Vascular Surgery

Check for updates

A retroperitoneal operative approach is associated with improved perioperative outcomes compared with a transperitoneal approach in open repair of complex abdominal aortic aneurysms

Vinamr Rastogi, MD,[a,b] Christina L. Marcaccio, MD, MPH,[a] Priya B. Patel, MD, MPH,[a] Rens R. B. Varkevisser, MD,[a,b] Virendra I. Patel, MD, MPH,[c] Peter A. Soden, MD,[d] Jorg L. de Bruin, MD, PhD,[b] Hence J. M. Verhagen, MD, PhD,[b] *and* Marc L. Schermerhorn, MD,[a] *Boston, MA; Rotterdam, The Netherlands; New York, NY; and Providence, RI*

ABSTRACT

Objective: Several studies have demonstrated the advantages of a retroperitoneal (RP) ... during open repair of infrarenal abdominal aortic aneurysms (AAAs). We ... complex AAAs (cAAAs) using an RP vs a TP approach and ...

Methods: We identified all patients who had ... 2003 to -2019 and created 1:1 ... primary outcome ... approach.

Eur J Vasc Endovasc Surg

Aorta and Major Branches

Retroperitoneal *versus* Transperitoneal Approach for Open Re... Complex Abdominal Aortic Aneurysms

Vinamr Rastogi [a,b,1], **Nicole H. Kim** [a,1], **Christina L. Marcaccio** [a], **Priya B. Patel** [a], **Rens R.B. Varkevisser** [b], **Jorg L. de Bruin** [b], **Marc L. Schermerhorn** [a,*]

[a] Department of Surgery, Division of Vascular and Endovascular Surgery, Beth Israel Deaconess Medical Centre, Harvard Me...
[b] Department of Vascular Surgery, Erasmus University Medical Centre, Rotterdam, the Netherlands

WHAT THIS PAPER ADDS

The retroperitoneal (RP) approach for complex open abdominal aortic aneurysm (... lower peri-operative mortality and morbidity rates compared with a transperi... use of the RP approach has decreased over time, including for repairs of ... abdominal aneurysms, and repairs using a supraceliac clamp site. Increas... when appropriate, may lead to improved outcomes following open repair

From the Society for Vascular Surgery

Check for up...

Retroperitoneal vs transperitoneal approach for nonruptured open conversion after endovascular aneurysm repair

Sara Allievi, MD,[a,b] Elisa Caron, MD,[a] Vinamr Rastogi, MD,[c] Sai Divya Yadavalli, MD,[a] Gabriel Jabbour, MS,[a] Tim J. Mandigers, MD,[a,b,d] Thomas F. X. O'Donnell, MD,[e] Virendra I. Patel, MD, MPH,[e] Francesco Torella, MD, FRCS,[f,g,h] Hence J. M. Verhagen, MD, PhD,[c] Santi Trimarchi, MD, PhD,[b,i] *and* Marc L. Schermerhorn, MD,[a] *Boston, Massachusetts; Milan, Italy; Rotterdam and Utrecht, The Netherlands; New York, New York; and Liverpool, UK*

ABSTRACT

Objective: Several studies comparing the transperitoneal (TP) and retroperitoneal (RP) approach for abdominal aortic aneurysm (AAA) repair suggest that the RP approach may result in lower rates of perioperative mortality and morbidity. However, data comparing these approaches for open conversion after endovascular aneurysm repair (EVAR) are lacking. This study aims to evaluate the association between the type of approach and outcomes following open conversion after endovascular aneurysm repair (EVAR).

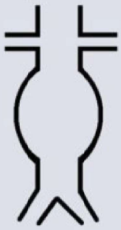
Methods: We included all patients who underwent open conversion after EVAR between 2010 and 2022 in the Vascular Quality Initiative. Patients presenting with rupture were excluded. The primary outcome was perioperative mortality. Inverse probability weighting was used to adjust for factors with statistical or clinical significance. Logistic regression was used to assess perioperative mortality and secondary outcomes included perioperative complications and 5-year mortality. Kaplan-Meier and Cox regression.

Results: We identified 660 patients (39% RP) who underwent open conversion after EVAR. Compared with TP, RP patients were older (75 years [interquartile range, 70-79 years] vs 73.5 years [interquartile range, 68-79 years]; $P < .001$), and more frequently had prior myocardial infarction (33% vs 22%; $P = .002$). Compared with the TP approach, the RP approach was used less frequently in cases of associated iliac aneurysm (19% vs 27%; $P = .026$), but more frequently with high-volume physicians (highest quintile, >35 AAA annually: 36% vs 20%; $P < .001$). RP patients, in high-volume centers (highest quintile, >7 AAA annually: 41% vs 17%; $P < .001$) and by high-volume physicians (highest quintile, >35 AAA annually: 36% vs 20%; $P < .001$). RP patients, were less likely to have external iliac or femoral distal anastomosis (8.2% vs 21%; $P < .001$). RP patients compared with TP patients, had similar odds of perioperative mortality (aOR, 0.43; 95% CI, 0.22-0.85; $P = .015$). No an infrarenal clamp (25% vs 36%; $P < .001$). Unadjusted perioperative mortality was not significantly different between approaches (RP vs TP: 3.8% vs 7.5%; $P = .077$). After risk adjustment, RP patients had similar odds of perioperative mortality (adjusted odds ratio [aOR], 0.49; 95% confidence interval [CI], 0.22-1.10; $P = .082$), and lower odds of intestinal ischemia (aOR, 0.26; 95% CI, 0.08-0.86; $P = .028$) and in-hospital reintervention (aOR, 0.43; 95% CI, 0.22-0.85; $P = .015$). No significant differences were found in the other perioperative complications or 5-year mortality (aHR, 0.79; 95% CI, 0.47-1.32; $P = .37$).

Conclusions: Our findings suggest that the RP approach may be associated with a lower adjusted odds of ... complications compared with the TP approach. The RP approach should be considered for ... when feasible. (J Vasc Surg 2025;81:118-27.)

Outcomes of Retroperitoneal Versus Transperitoneal Approach for Open Abdominal Aortic Aneurysm Repair Stratified by Aortic Cross-Clamping Site

Analysis of 8,842 Open AAA repair procedures

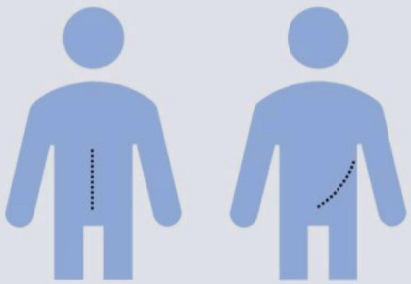


Aortic cross-clamp levels:

- Infrarenal 48%
- Inter-renal 17%
- Suprarenal 28%
- Supraceliac 6%

AAA exposure techniques:

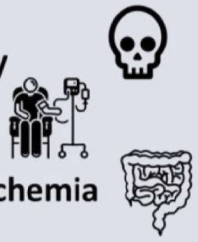
Transperitoneal | Retroperitoneal



72% | 28%

Retroperitoneal approach is the superior exposure technique in cases requiring interrenal, suprarenal or supraceliac clamping

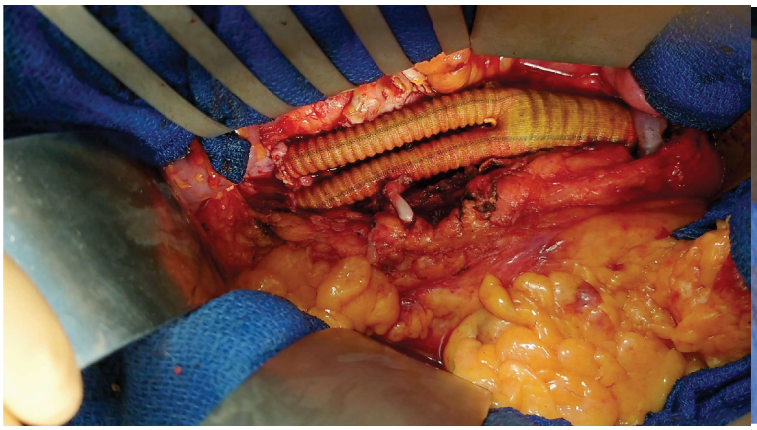
- ↓ Mortality
- ↓ Dialysis
- ↓ Bowel ischemia

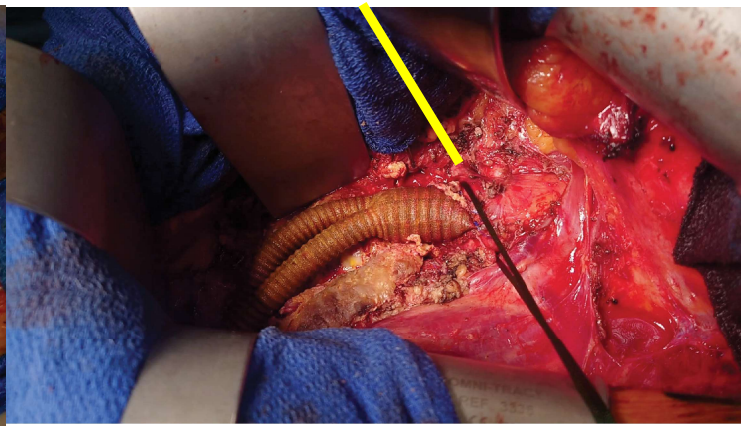


Hamouda et al, *J Am Coll Surg*, July 2025

JACS JOURNAL OF THE AMERICAN COLLEGE OF SURGEONS

Choix de la voie d'abord?





Pourquoi la néphroprotection?

- Souffrance rénale

- A COURT TERME:

  - Ice rénale post op : SDRA , DMV, et mortalité post opératoire.

  - Dialyse post opératoire: +23% à 40% de décès.



Kidneys for Life: Stop Acute Kidney Injury

Wynn MW et al. J Vasc Surg 2015.
Patel VI et al. J Vasc Surg 2015

Pourquoi la néphroprotection?

- **A MOYEN TERME:**

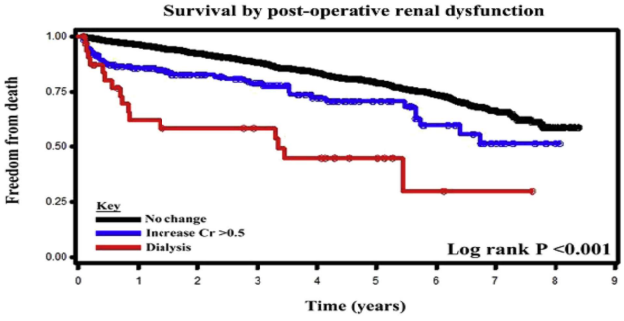
  - La gravité de l'insuffisance rénale (Akin 3).
  - Sa durée (> 1 sem) en post opératoire.
  - La notion de dialyse même temporaire.

Facteurs indépendants de mortalité à long terme.

Ellenberger C, et al. Intensive Care Med. 2006
Welten GMJM, et al. Am J Kid Dis off Natl Kidn Found. 2007
Hobson CE, et al. Circulation 2009.
Khuri SF, et al. Ann Surg2005.

Postoperative renal dysfunction independently predicts late mortality in patients undergoing aortic reconstruction

Virendra I. Patel, MD, MPH, Robert T. Lancaster, MD, MPH, Emel Ergul, MS, Mark F. Conrad, MD, MSSc, Daniel Bertges, MD, Marc Schermerhorn, MD, Philip Goodney, MD, and Richard P. Cambria, MD, *Boston, Mass*



(J Vasc Surg 2015;62:1405-12.)

Pourquoi la néphroprotection?

Postoperative Renal Complications Adversely Impact Late Survival Following Open Juxtarenal Aortic Aneurysm Repair

Priya B. Patel,[1] Christina L. Marcaccio,[2] Thomas O'Donnell, Jessica Ding, Karan Garg,[3] Jeffrey J. Siracuse,[4] Marc L. Schermerhorn,[5] Hiroo Takayama, Virendra I. Patel[6]. [1]Department of General Surgery, Rutgers Robert Wood Johnson, New Brunswick, NJ; [2]Beth Israel Deaconess Medical Center, Boston, MA; [3]New York University Langone Medical Center, New York, NY; [4]Boston University, Chobanian and Avedisian School of Medicine, Boston, MA; [5]Department of Surgery, Division of Vascular and Endovascular Surgery, Beth Israel Deaconess Medical Center, Harvard Medical School, Boston, MA; [6]Division of Vascular and Endovascular Interventions, New York Presbyterian/Columbia University Irving Medical Center, New York, NY

Objective: Preoperative renal function is a predictor of morbidity and mortality after the repair of juxtarenal aortic aneurysms. However, the impact of postoperative renal failure on late outcomes after repair are poorly understood. Therefore, our objective was to assess the impact of postoperative renal dysfunction on long-term outcomes after juxtarenal aortic aneurysm repair.

Methods: We identified all open repairs of juxtarenal aortic aneurysms in the Vascular Quality Initiative from 2011 to 2018 with linkage to Medicare claims data. Juxtarenal aortic aneurysm repair was defined as the placement of proximal clamp above at least one renal artery during open repair. Postoperative renal function was categorized as stable renal function, acute kidney injury (AKI; ≥0.5 mg/dL serum creatinine increase) or new renal replacement therapy (RRT). Kaplan-Meier estimates and Cox regression were used to identify the effect of AKI or RRT on 5-year mortality, rupture, and reintervention.

Results: Of 1643 open repairs, 29% experienced postoperative AKI, and 6.5% required RRT. Renal visceral ischemia time >25 minutes was higher in the AKI and RRT cohorts (stable: 52% vs AKI 65% vs RRT 67%; $P < .001$). Postoperative mortality was higher with increasing severity of postoperative renal dysfunction (2.5% vs 9.5% vs 31%; $P < .001$). Increasing renal

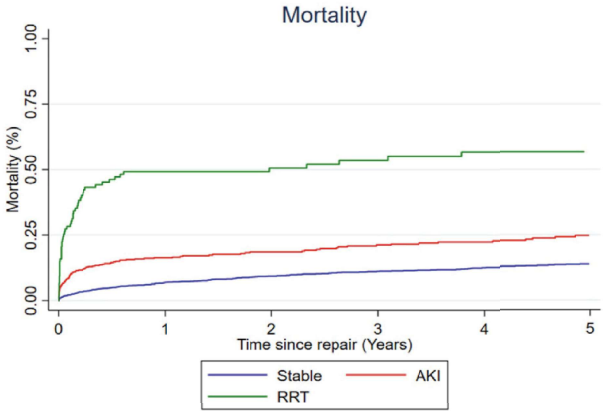


Fig. 5-year survival following open repair of juxtarenal aortic aneurysm stratified by postoperative renal function .

Author Disclosures: J. Ding: Nothing to disclose; **K. Garg:** Nothing to disclose; **C. L. Marcaccio:** Nothing to disclose; **T. O'Donnell:** Nothing to disclose; **P. B. Patel:** Nothing to disclose; **V. I. Patel:** Nothing to disclose; **M. L. Schermerhorn:** Nothing to disclose; **J. J. Siracuse:** Nothing to disclose; **H. Takayama:** Nothing to disclose.

Clinical Practice Guidelines

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EJVES Open Access

CLINICAL PRACTICE GUIDELINE DOCUMENT

Editor's Choice – European Society for Vascular Surgery (ESVS) 2024 Clinical Practice Guidelines on the Management of Abdominal Aorto-Iliac Artery Aneurysms☆

Anders Wanhainen [a,*], Isabelle Van Herzeele [a], Frederico Bastos Goncalves [a], Sergi Bellmunt Montoya [a], Xavier Berard [a], Jonathan R. Boyle [a], Mario D'Oria [a], Carlota I. Prendes [a], Christos D. Karkos [c], Arkadiusz Kazimierczak [a], Mark J.W. Koelemay [a], Tilo Kölbel [a], Kevin Mani [a], Germano Melissano [a], Janet T. Powell [a], Santi Trimarchi [a], Nikolaos Tsilimparis [a]

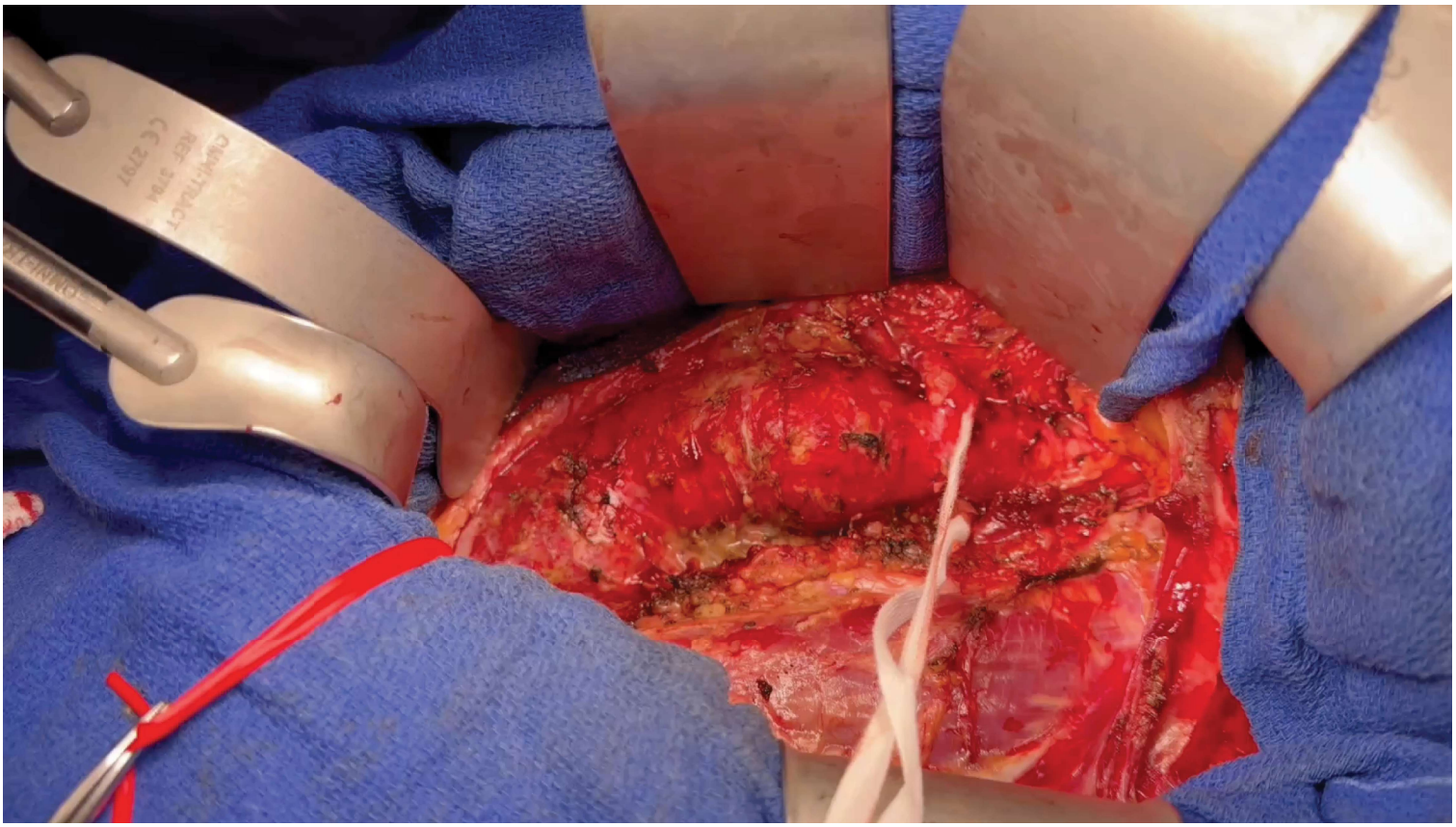
ESVS Guidelines Committee [b], George A. Antoniou, Martin Björck, Raphael Coscas, Nuno V. Dias, Philippe Kolh, Sandro Lepidi, Barend M.E. Mees, Timothy A. Resch, Jean Baptiste Ricco, Riikka Tulamo, Christopher P. Twine

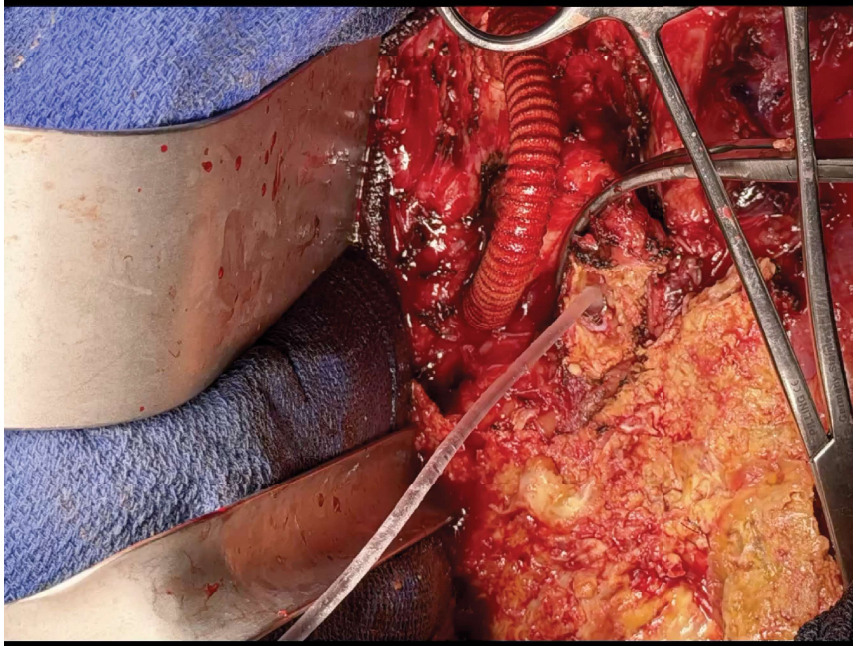
Document Reviewers [c], Daniela Branzan, Stephen W.K. Cheng, Ronald L. Dalman, Florian Dick, Jonathan Golledge, Stephan Haulon, Joost A. van Herwaarden, Nikola S. Ilic, Arkadiusz Jawien, Tara M. Mastracci, Gustavo S. Oderich, Fabio Verzini, Kak Khee Yeung

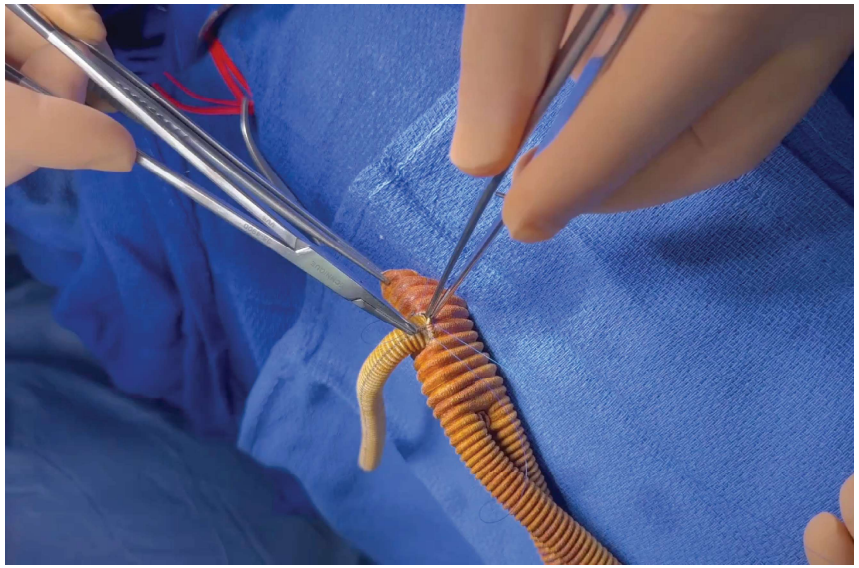
122. Endovascular repair for a complex abdominal aortic aneurysm using parallel graft techniques should only be considered as an option in the emergency setting, or as a bailout, and ideally restricted to ≤ 2 chimneys *(upgraded to Class IIa)*

125. For patients undergoing open repair of a complex abdominal aortic aneurysm with a suprarenal clamp time > 25 minutes, cold renal perfusion should be considered *(upgraded to Class IIa)*

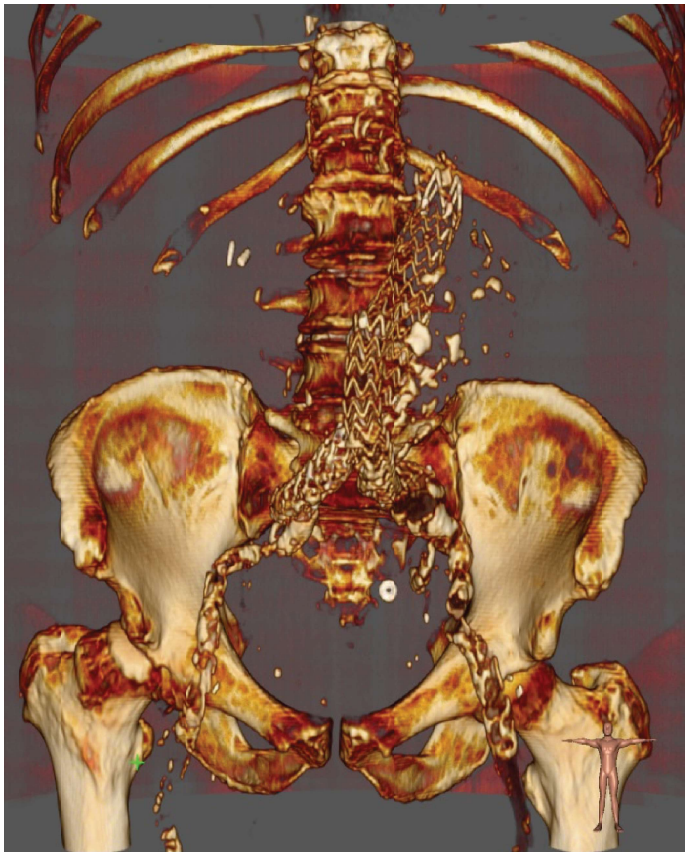
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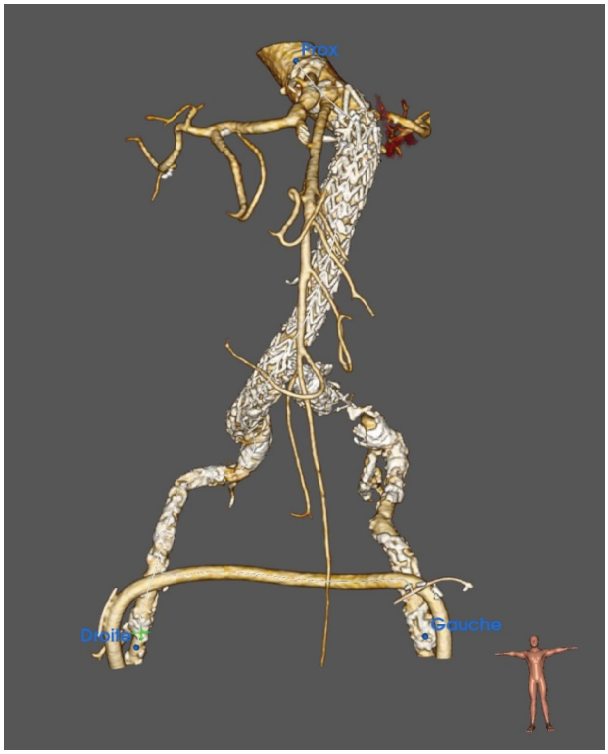


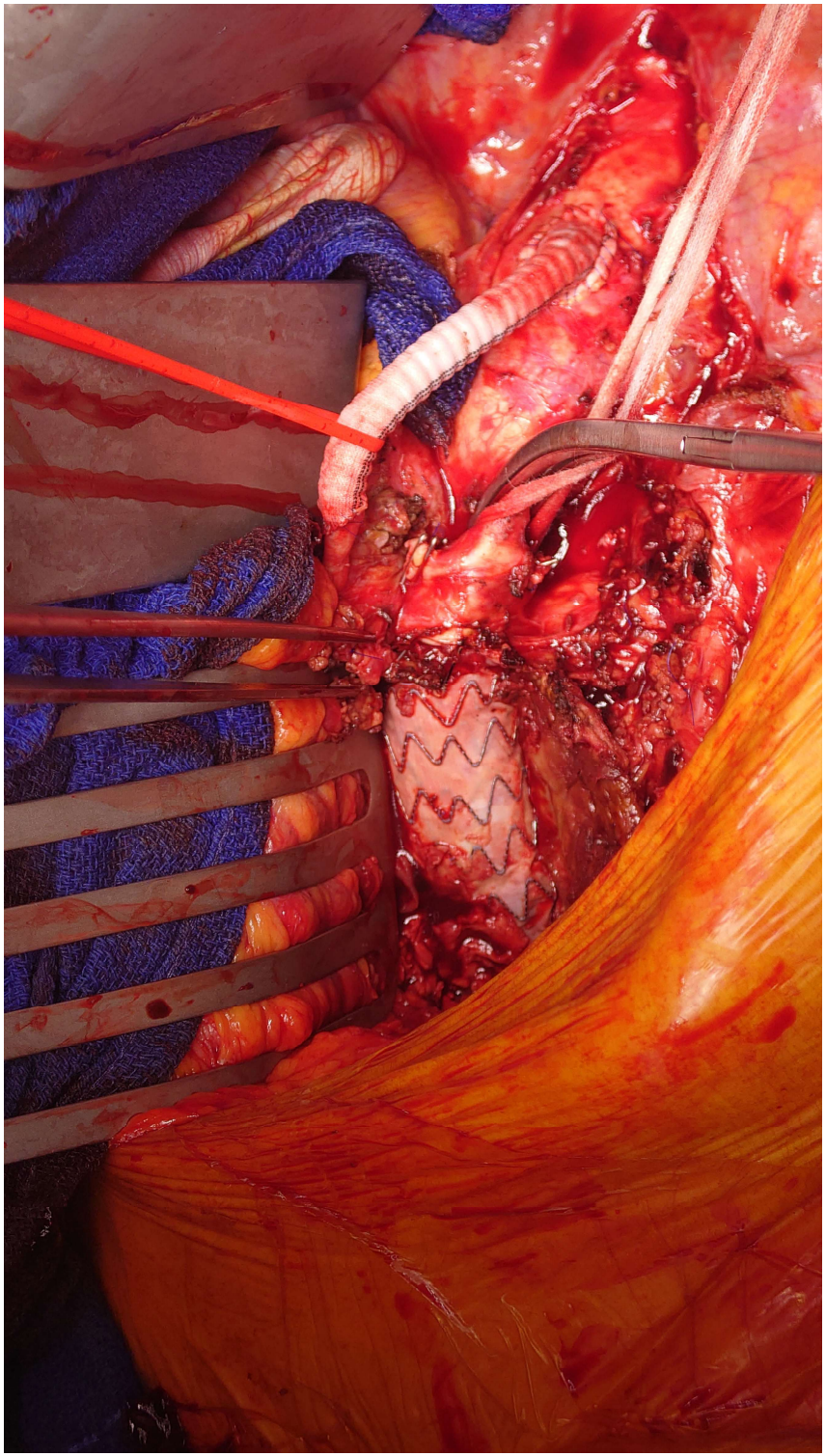


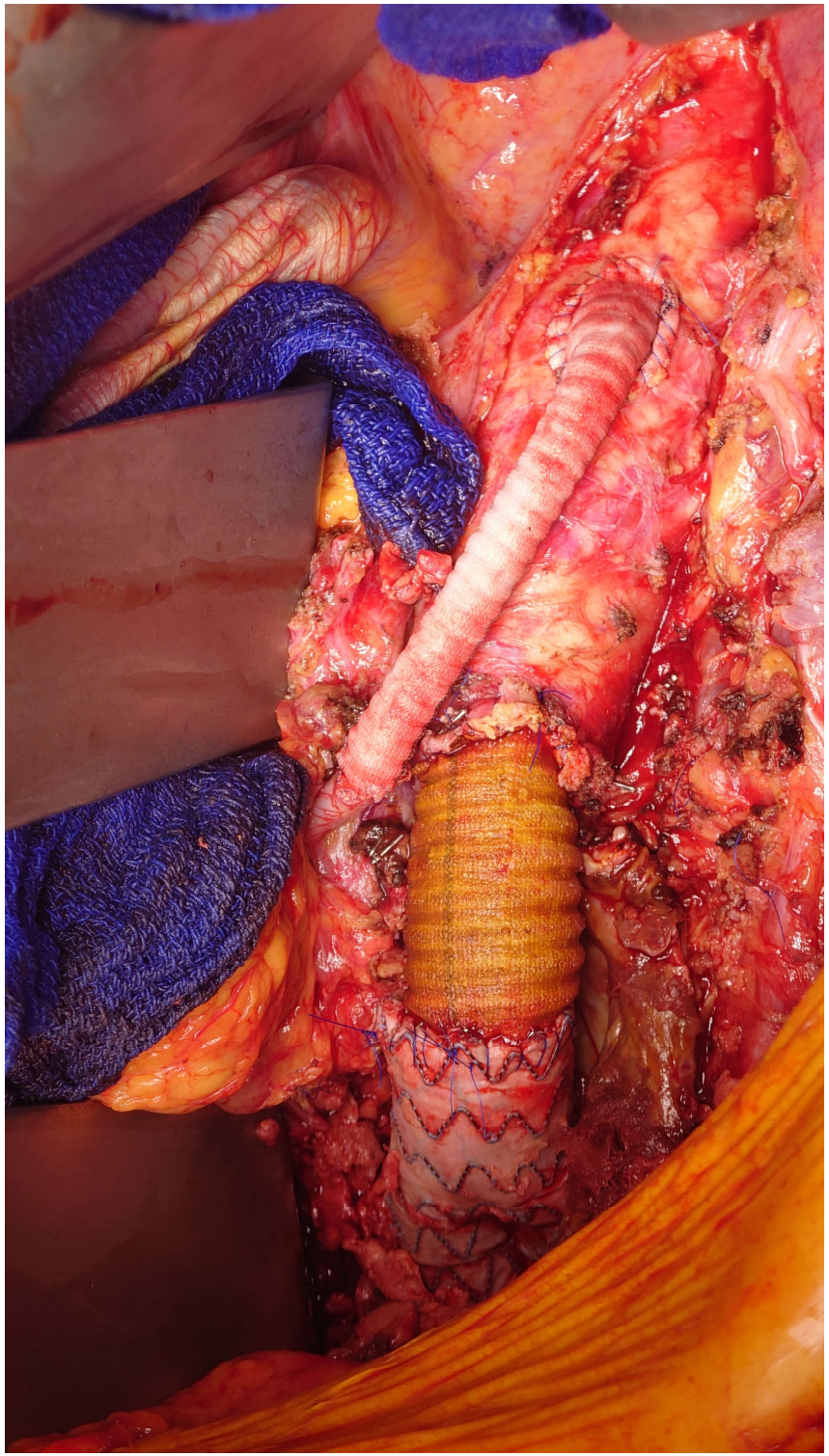

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gauche
postérieur

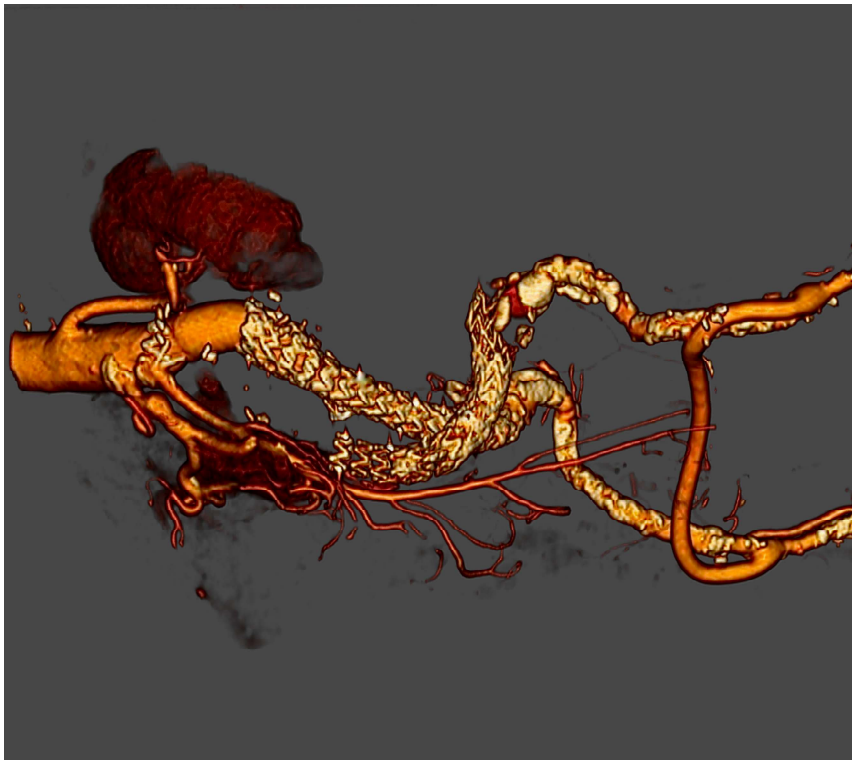


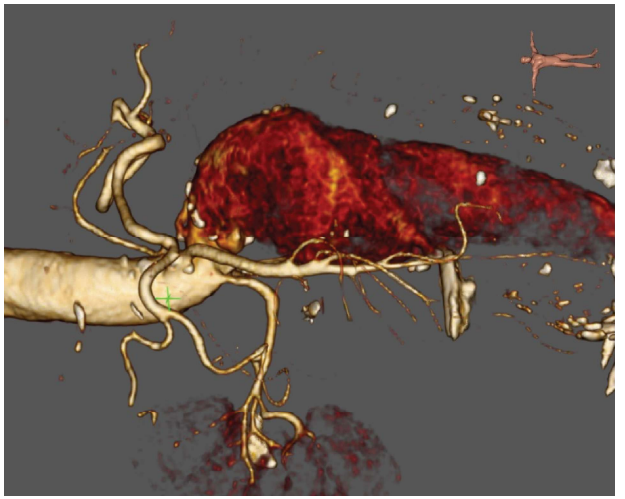

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droite
gauche
postérieur

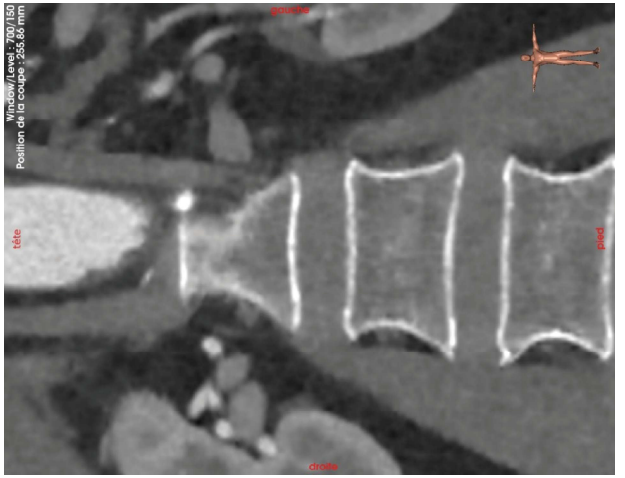

Dos
Droite
Gauche

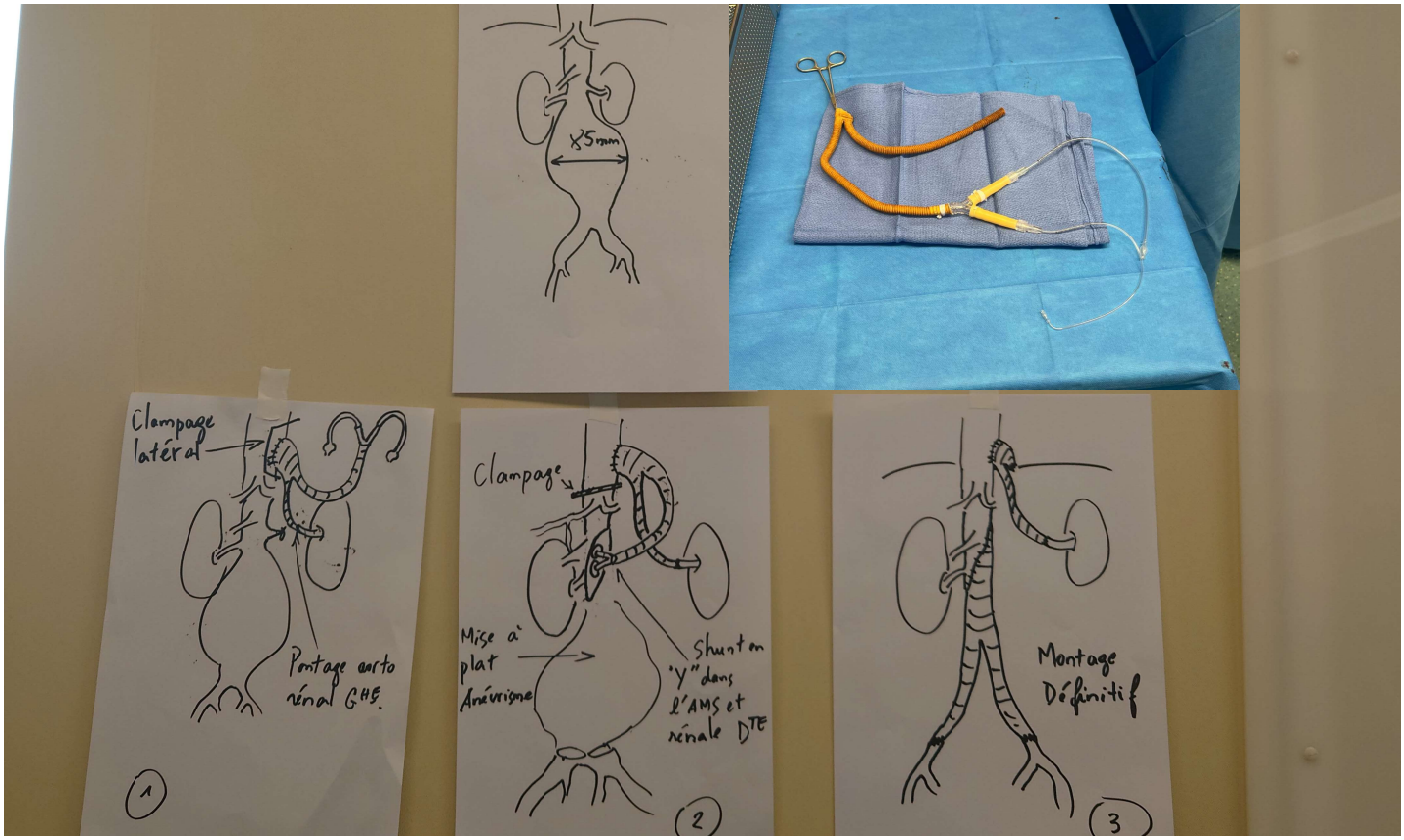


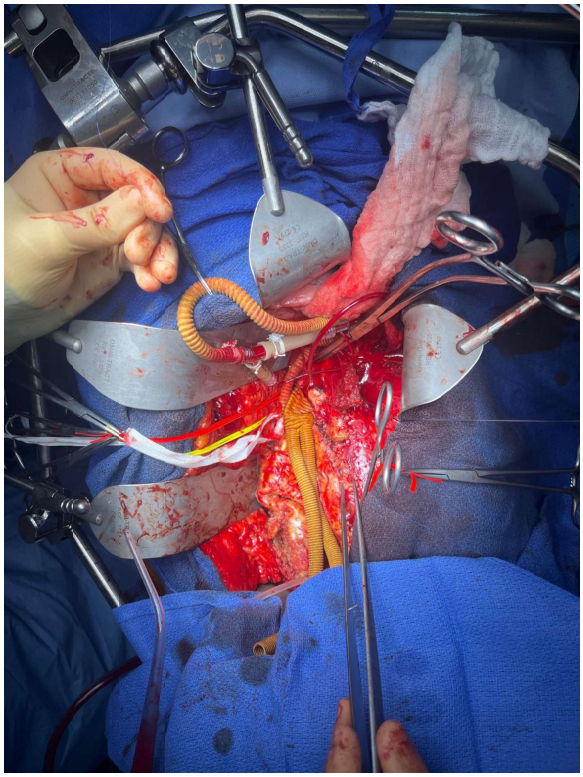




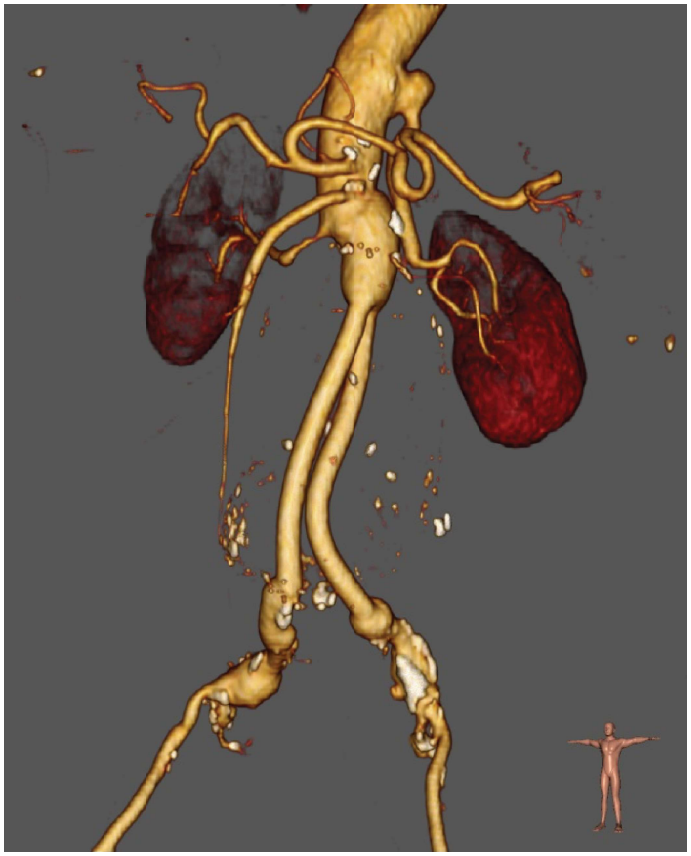



Window/Level : 700/150
Position de la coupe : 265.86 mm
gauche
tête
pied
droite


Clampage latéral
Pontage aorto rénal GHE
1
Clampage
Mise à plat Anévrisme
Shunt en "y" dans l'AMS et rénale DTE
2
Montage Définitif
3







Conclusion

- Il n y aura pas de résurrection, mais une résistance face à certaines limites anatomiques de l'endo.

- Acte lourd -> Stratégie opératoire claire dès le départ, axée non seulement sur l'aorte mais aussi la ***protection rénale et viscérale+++***

- Non protection d'organe -> Altération du bénéfice préventif à long terme de cette intervention ??



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