Indications for Bilateral Iliac Branch Devices: Tips and Tricks

Samuel Jessula, MD, MSc, FRCSC

Dalhousie University

April 2nd 2025

WVES Winnipeg Vascular & Endovascular Symposium

Presenter Disclosure

Presenter: Samuel Jessula

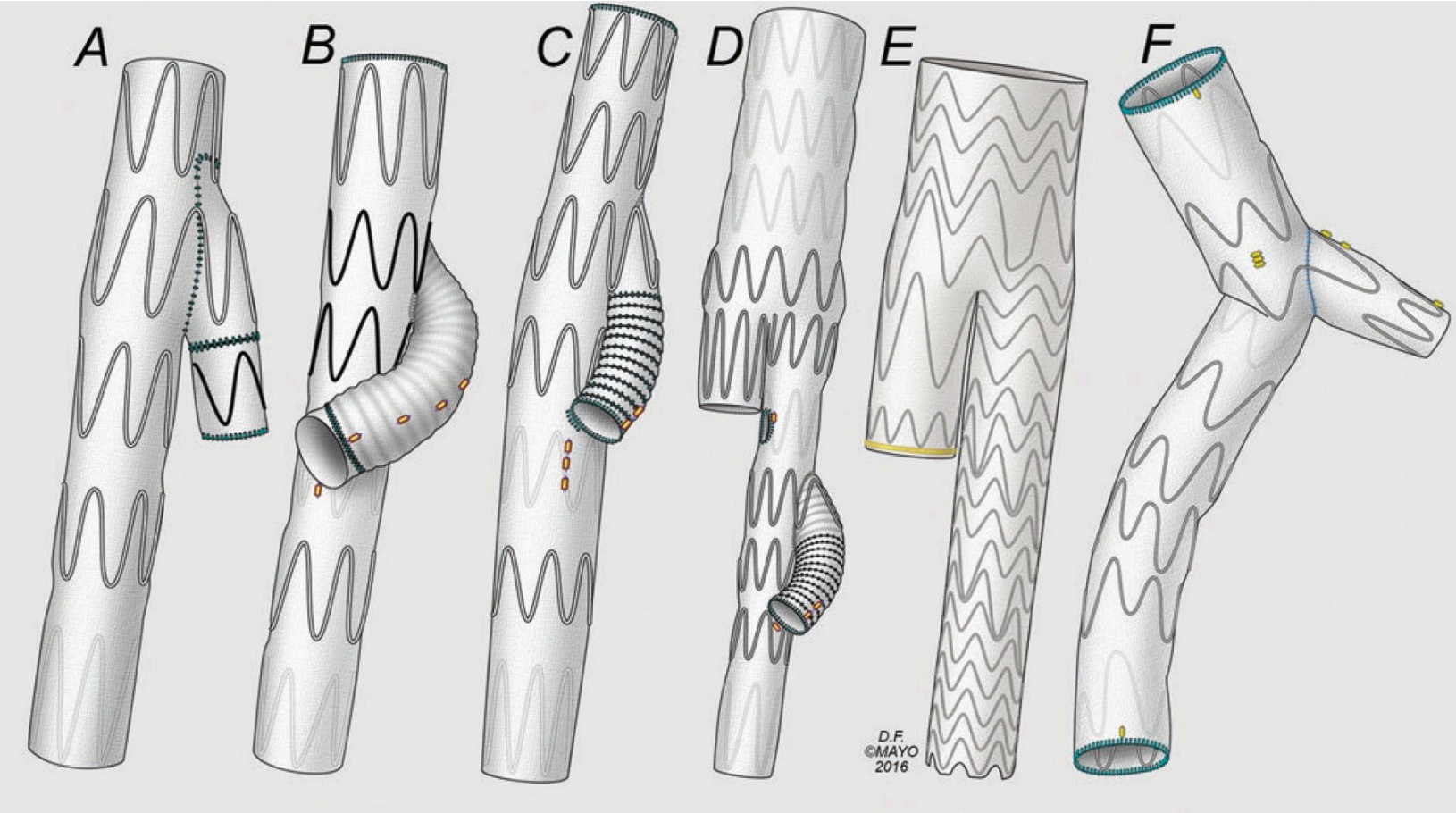
- I have no current relationships with commercial entities

POLL

- 67 yo male, incidental finding of 4.0 cm AAA, 6.9cm L CIA and 5.5cm R CIA. Past medical history HTN, DLP, CAD/MI, Ef 40%, ICD, Afib (warfarin), ex-smoker.
- Treatment?
- 1. Open repair
- 2. Bilateral IBD
- 3. IBD on Left, coil and cover R
- 4. IBD on right, coil and cover L
- 5. Hybrid repair

INDICATIONS

- Bilateral iliac aneurysm
- AAA that meets size criteria for repair with inadequate distal seal.



Iliac Aneurysms

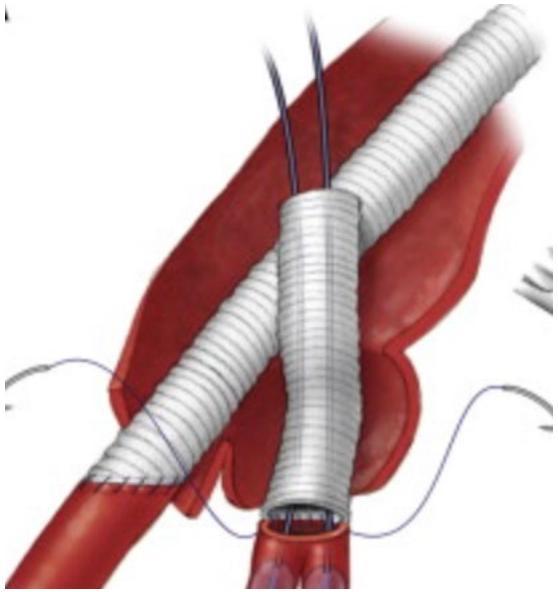
- Prevalence:
  - Solitary: 0.03%
  - 25% of patients with AAAs
- Bilateral 12-48% of the time
- Rarely rupture below 40mm

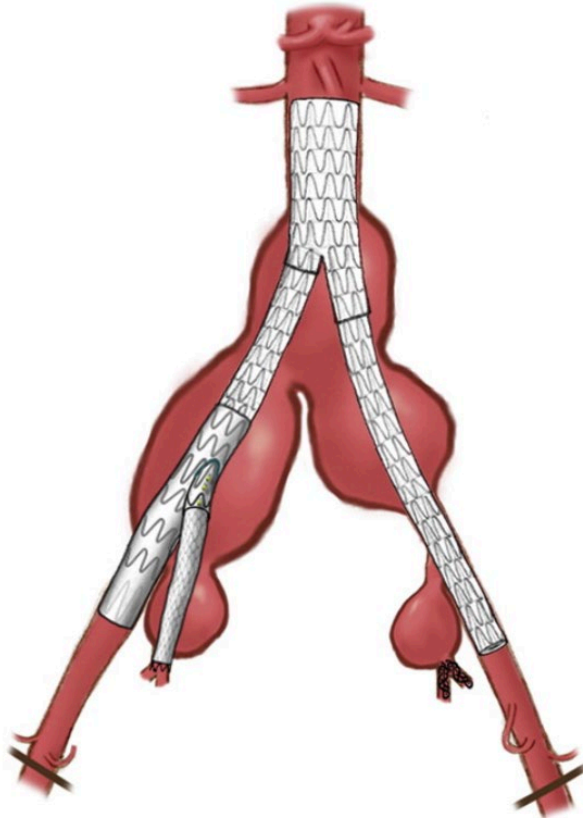
Recommendation 135			Changed
Patients with an iliac artery aneurysm (common iliac artery, internal iliac artery, and external iliac artery, or combination thereof) should be considered for elective repair at a diameter of ≥ 40 mm.			
Class	**Level**	**References**	**ToE**
IIa	C	Charisis *et al.* (2021),[826] Laine *et al.* (2017),[1065] Krupski *et al.* (1998),[1066] Chaer *et al.* (2008),[1072] Steenberge *et al.* (2022),[1077] Huang *et al.* (2008),[1079] Jalalzadeh *et al.* (2020),[1081] Fossaceca *et al.* (2015),[1083] Kasirajan *et al.* (1998),[1084] Kobe *et al.* (2018)[1085]	

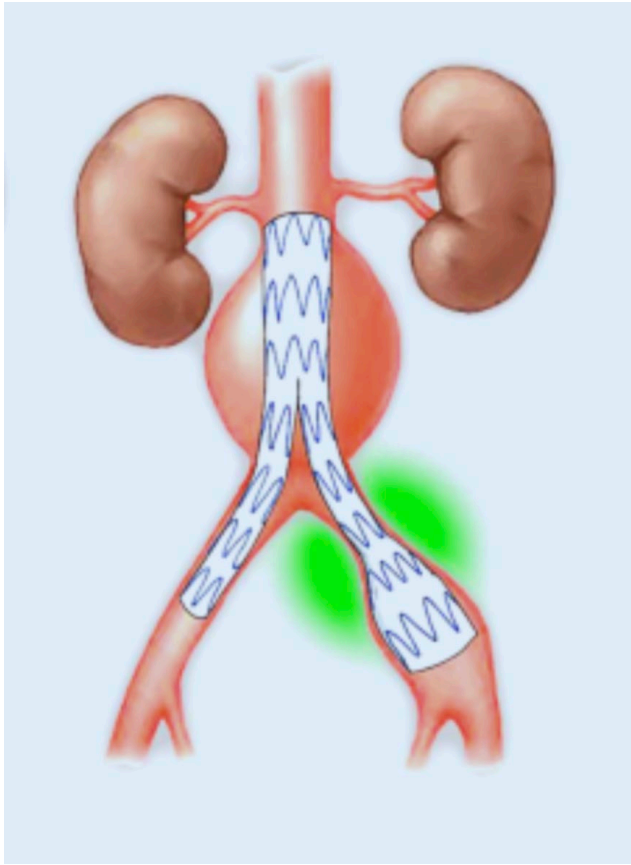
Zettervall, Sara L., and Andres Schanzer. "ESVS 2024 clinical practice guidelines on the management of abdominal aorto-iliac artery aneurysms: a North American perspective." *European Journal of Vascular and Endovascular Surgery* 67.2 (2024): 187-189.
Chaikof, Elliot L., et al. "The Society for Vascular Surgery practice guidelines on the care of patients with an abdominal aortic aneurysm." *Journal of vascular surgery* 67.1 (2018): 2-77.

Adequate Seal for EVAR

- Alternate options:
  - Open repair
  - Coil and Cover
  - Bell Bottom technique





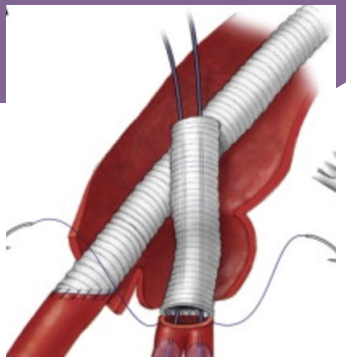


Open Repair

Comparison of Perioperative Outcomes of Patients with Iliac Aneurysms Treated by Open Surgery or Endovascular Repair with Iliac Branch Endoprosthesis

Annals of Vascular Surgery

Volume 60, October 2019



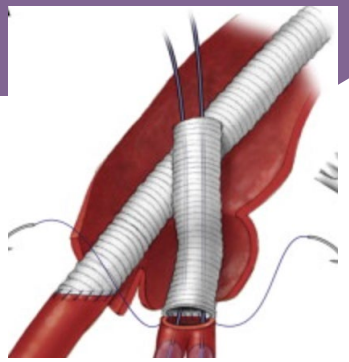
Bernardo C. Mendes, Gustavo S. Oderich, Giuliano A. Sandri, Jill K. Johnstone, Fahad Shuja, Manju Kalra, Thomas C. Bower, and Randall R. DeMartino, Rochester, Minnesota

Table III. Postoperative complications in 67 patients treated for aortoiliac aneurysms with open or endovascular repair

Postoperative complications	Overall ($n = 67$)	Open ($n = 25$)	IBE ($n = 44$)	P value
Mortality	1 (1.5)	1 (4)	0	0.36
Morbidity	12 (18)	9 (36)	3 (7)	0.004
Respiratory	3 (4.5)	3 (12)	0	0.04
Wound complications	8 (12)	4 (16)	2 (4.5)	0.44
Leg ischemia/distal emboli	4 (6)	2 (8)	1 (4.5)	0.61
Arrhythmia requiring cardioversion	2 (3)	2 (8)	0	0.04
Bowel ischemia	2 (3)	2 (8)	0	0.12
Dialysis	1 (1.5)	1 (4)	0	0.36
Postoperative RBC transfusion	0.76 ± 1.9	2.0 ± 2.7	0.02 ± 0.15	0.0001
Length of stay				
ICU	1.3 ± 2.0	3.3 ± 2.1	0.1 ± 0.4	0.0001
Total	4.0 ± 3.6	7.5 ± 3.4	1.7 ± 1.4	0.0001

Open Repair

Outcomes of open and endovascular repair for ruptured and nonruptured internal iliac artery aneurysms

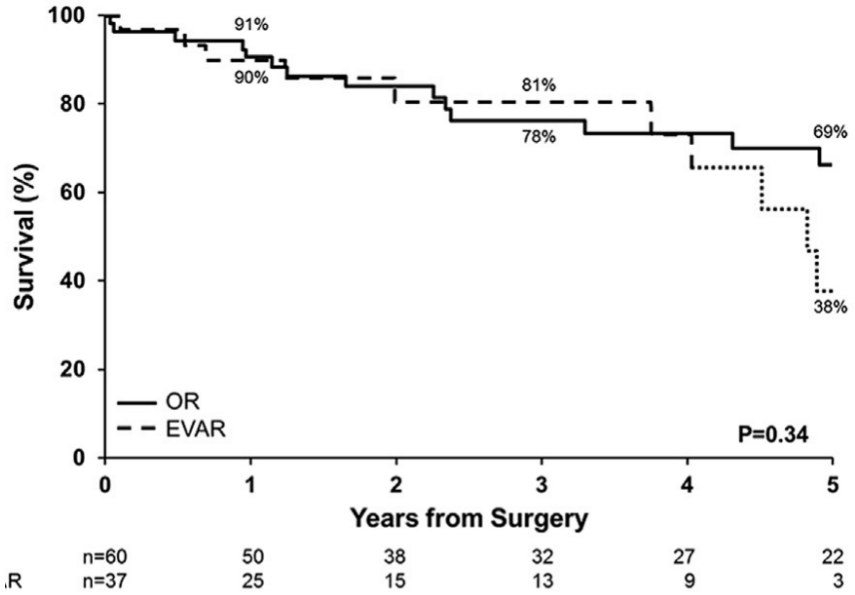


Muhammad A. Rana, MBBS,[a] Manju Kalra, MBBS,[a] Gustavo S. Oderich, MD,[a] Eileen de Grandis, MD,[b] Peter Gloviczki, MD,[a] Audra A. Duncan, MD,[a] Steven S. Cha, MS,[c] and Thomas C. Bower, MD,[a]
Rochester, Minn

JOURNAL OF VASCULAR SURGERY
Volume 59, Number 3

	OR		II-EVAR		
	No.	*%*	*No.*	*%*	P
30-day mortality	2	3	0	0	.26
Perioperative morbidity	26	43	3	8	<.001
Myocardial infarction	3	5	1	3	.58
Congestive heart failure	1	2	0	0	.43
Arrhythmia	6	6	0	0	.05
Respiratory failure[a]	6	10	0	0	.04
Renal insufficiency[b]	8	13	1	3	.08
Dialysis	2	3	0	0	.26
Acute pelvic ischemia[c]	2	3	1	3	.62
Median length of hospital stay, days	9		1		<.001

[a]Mechanical ventilation >48 hours.
[b]Change in serum creatinine ≥0.4.
[c]Ischemic colitis and paraplegia.



Bilateral Iliac Branch

A systematic review and meta-analysis of the clinical effectiveness and safety of unilateral versus bilateral iliac branch devices for aortoiliac and iliac artery aneurysms

Zhanjiang Cao, MD,[a] Rongrong Zhu, MD,[a] Amir Ghaffarian, MD,[b] Weiwei Wu, MD,[a] Chengxin W
Xiyang Chen, MD,[c] Sherene Shalhub, MD, MPH,[b] Benjamin W. Starnes, MD,[b] *and* Wayne W. Zha
Beijing and Chengdu, Sichuan, China; and Seattle, Wash

Journal of Vascular Surgery
October 2022

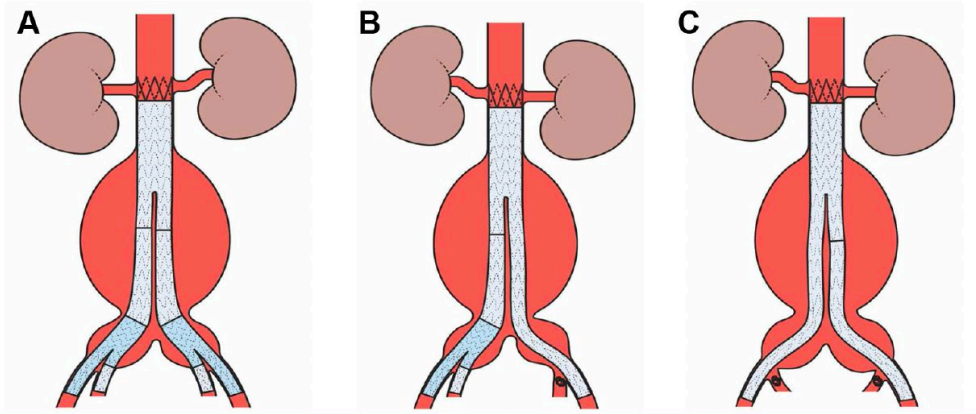


Table II. Subgroup analysis comparing incidences of pelvic ischemia

Pelvic ischemia	Group I bilateral IBDs	Group II unilateral IBD + contralateral IIA embolization/coverage	Group III bilateral IIA embolization/coverage	*P* value
Buttock claudication % (95% CI)	0.00 (0.00%-1.21%) (n = 1/146)	7.92 (3.87%-12.86%) (n = 23/204)	33.84 (24.65%-43.55%) (n = 70/207)	Group I vs II: $P < .01$ Group II vs III: $P < .01$ Group I vs III: $P < .01$
Sexual dysfunction % (95% CI)	0.00 (0.00%-0.49%) (n = 0/132)	0.00 (0.00%-0.75%) (n = 0/190)	5.04 (0.62%-11.90%) (n = 9/91)	Group I vs II: $P = .85$ Group II vs III: $P < .01$ Group I vs III: $P < .01$
Bowel ischemia % (95% CI)	0.00 (0.00%-0.29%) (n = 0/146)	0.00 (0.00%-1.04) (n = 1/204)	0.00 (0.00%-0.47%) (n = 1/185)	Group I vs II: $P = .75$ Group II vs III: $P = .96$ Group I vs III: $P = .79$

CI, Confidence interval; *IBD*, iliac branch device; *IIA*, internal iliac artery.

In Real Life

A systematic review on endovascular repair of isolated common iliac artery aneurysms and suggestions regarding diameter thresholds for intervention

Nektarios Charisis, MD,[a] Vasileios Bouris, MD,[b] Alexander Rakic, MD,[a] David Landau, MD,[a] *and* Nicos Labropoulos, PhD,[a] *Stony Brook and New York, NY*

Journal of Vascular Surgery
Volume 74, Number 5

- In 11 studies, the overall development of buttock claudication attributed to the embolization **was 11.2% (28/249).** Postprocedural sexual dysfunction, bowel ischemia, and spinal cord ischemia were all sparsely reported (Charisis et al, 2021)

Surgical and Endovascular Management of Isolated Internal Iliac Artery Aneurysms: A Systematic Review and Meta-Analysis

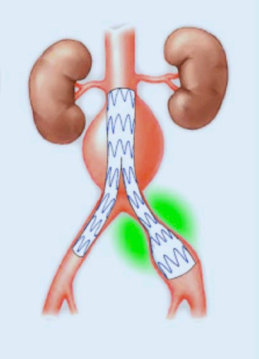
Paolo Perini, MD [1,2], Erica Mariani, MD[2], Mara Fanelli, MD [2], Alessandro Ucci, MD[2], Giulia Rossi, MD [2], Claudio Bianchini Massoni, MD, PhD [1,2], and Antonio Freyrie, MD,

Vascular and Endovascular Surgery 55(3)

- Buttock claudication occurred in **13.9%** of the patients (95%CI 8.7-19.2; I^2 0%, P = .622). (Perini et al, 2021)

Charisis, Nektarios, et al. "A systematic review on endovascular repair of isolated common iliac artery aneurysms and suggestions regarding diameter thresholds for intervention." *Journal of vascular surgery* 74.5 (2021): 1752-1762.
Perini, Paolo, et al. "Surgical and endovascular management of isolated internal iliac artery aneurysms: a systematic review and meta-analysis." *Vascular and endovascular surgery* 55.3 (2021): 254-264.

BELL BOTTOM TECHNIQUE



Volume Change after Endovascular Treatment of Common Iliac Arteries ≥ 17 mm Diameter: Assessment of Type 1b Endoleak Risk Factors

Eur J Vasc Endovasc Surg (2020) 59, 51—58

Anne-Florence Rouby, Salomé Kuntz, Charline Delay, Fabien Thaveau, Yannick Georg, Anne Lejay *, Nabil Chakfe

- Increased risk of Type 1B endoleak with Bell Bottom technique vs IBD if CIA>17mm

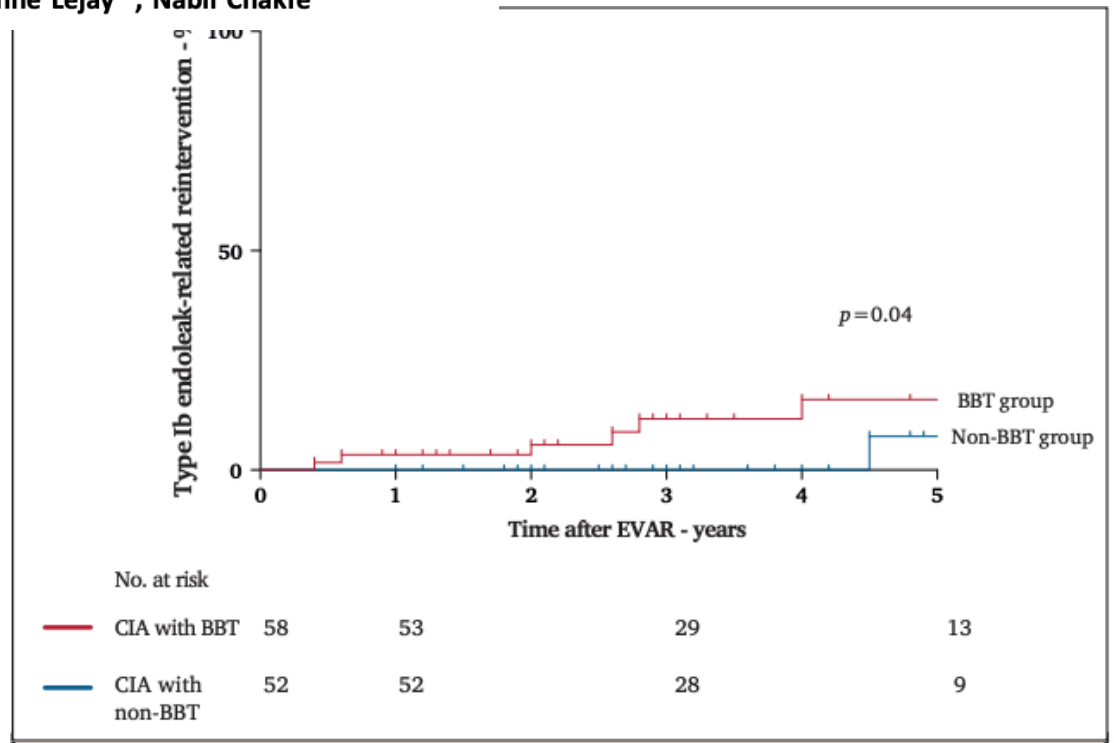


Figure 3. Cumulative Kaplan Meier estimates of need for type 1b endoleak-related reintervention after endovascular aneurysm repair (EVAR) of aortoiliac aneuryms with a common iliac artery ≥ 17 mm, stratified by type of distal EVAR sealing. BBT = bell bottom technique.

Bell Bottom vs Coil and Cover vs IBE

Five-year outcomes for bell bottom, iliac branch endoprosthesis, and coil and cover approaches from the GREAT registry

Angela Giese, MD, MS,[a] Jan M. M. Heyligers, MD, PhD,[b] *and* Ross Milner, MD,[c] *Chicago, Illinois; and Tilburg, The Netherlands*

Journal of Vascular Surgery
June 2024

Table VI. Percentage of patients that required reintervention within each limb group, further subdivided by type of intervention

Characteristic	0- to 5-Year window			
	Bell (n = 691)	Cover and coil (n = 152)	IBE (n = 81)	*P* value
All reinterventions	75 (10.9)	19 (12.5)	11 (13.6)	.7
Reintervention - conversion to open repair and/or explant	9 (1.3%)	0 (0.0)	0 (0.0)	.4
Reintervention - requiring additional Graft	15 (2.2)	2 (1.3)	7 (8.6)	.006
Device-related reintervention	60 (8.7)	11 (7.2)	11 (13.6)	.3

IBE, Iliac branch endoprosthesis.
Values are number (%).

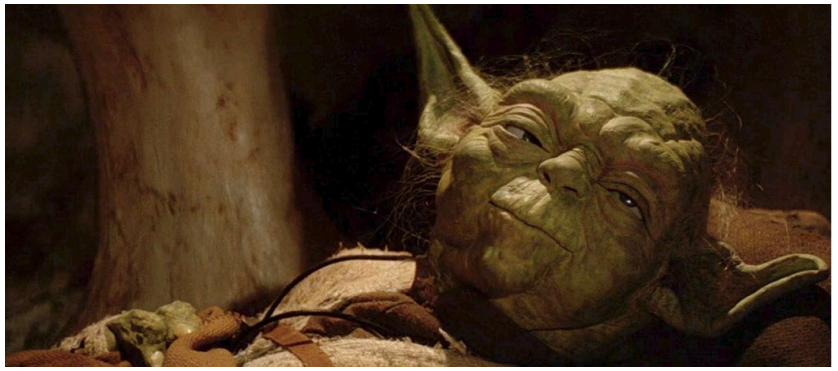
GUIDELINES

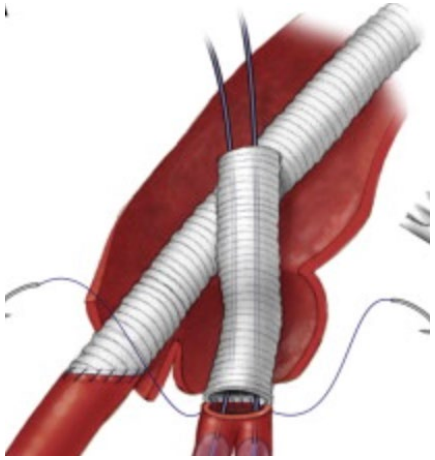
Recommendation 137		Unchanged
Preserving blood flow to at least one internal iliac artery during open surgical and endovascular repair of iliac artery aneurysms is recommended.		
Class	**Level**	**References** **ToE**
I	C	Bosanquet *et al.* (2017),[782] Jean-Baptiste *et al.* (2014)[1100]

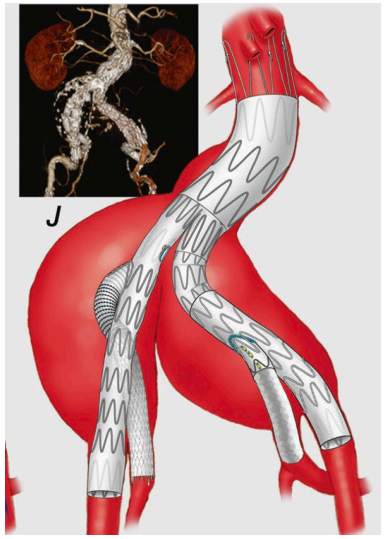
We recommend preservation of flow to at least one internal iliac artery.	
Level of recommendation	1 (Strong)
Quality of evidence	A (High)
We recommend using FDA-approved branch endograft devices in anatomically suitable patients to maintain perfusion to at least one internal iliac artery.	
Level of recommendation	1 (Strong)
Quality of evidence	A (High)
We recommend staging bilateral internal iliac artery occlusion by at least 1 to 2 weeks if required for EVAR.	
Level of recommendation	1 (Strong)
Quality of evidence	A (High)

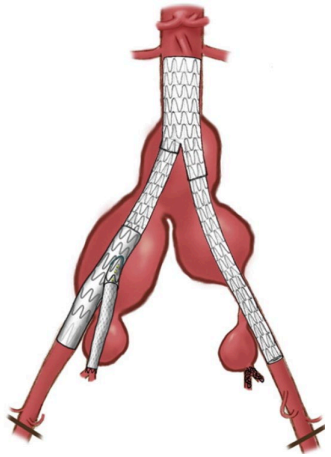
Zettervall, Sara L., and Andres Schanzer. "ESVS 2024 clinical practice guidelines on the management of abdominal aorto-iliac artery aneurysms: a North American perspective." *European Journal of Vascular and Endovascular Surgery* 67.2 (2024): 187-189.
Chaikof, Elliot L., et al. "The Society for Vascular Surgery practice guidelines on the care of patients with an abdominal aortic aneurysm." *Journal of vascular surgery* 67.1 (2018): 2-77.

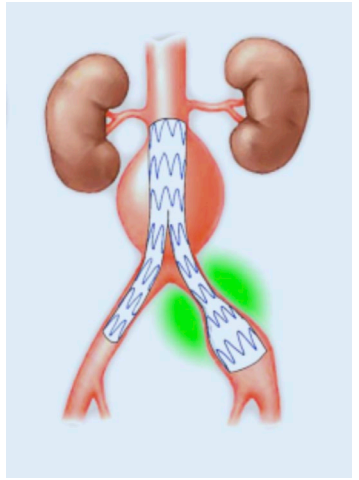
Who gets What?











IBD FROM UE ACCESS

Iliac branch device to treat type Ib endoleak with a brachial access or an "up-and-over" transfemoral technique

Thomas Mesnard, MD,[a,b] Benjamin O. Patterson, PhD, MRCS,[c] Richard Azzaoui, MD,[a] Louis Pruvot, MD,[a] Stéphan Haulon, MD, PhD,[d] *and* Jonathan Sobocinski, MD, PhD,[a,b] *Lille and Le Plessis Robinson, France; and Southampton, UK*

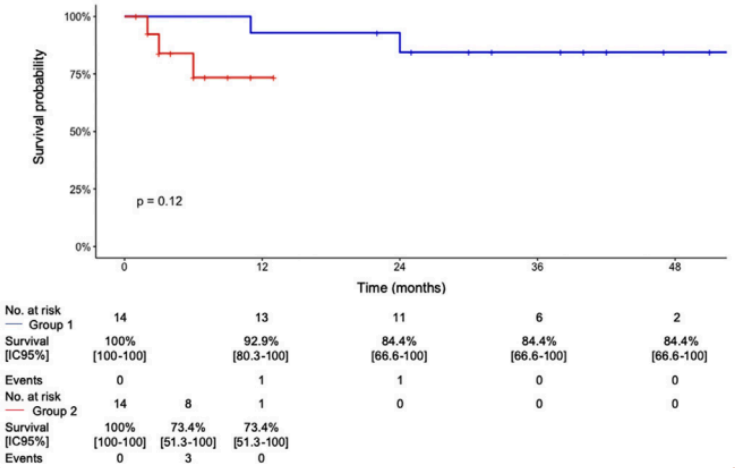


Fig 1. Cumulative Kaplan-Meier survival estimates of all-cause survival of 28 patients treated using an iliac branch device (IBD) via upper limb access (group 1) or an "up-and-over" transfemoral technique (group 2) for type Ib endoleaks. *IC95%*, 95% Confidence interval.

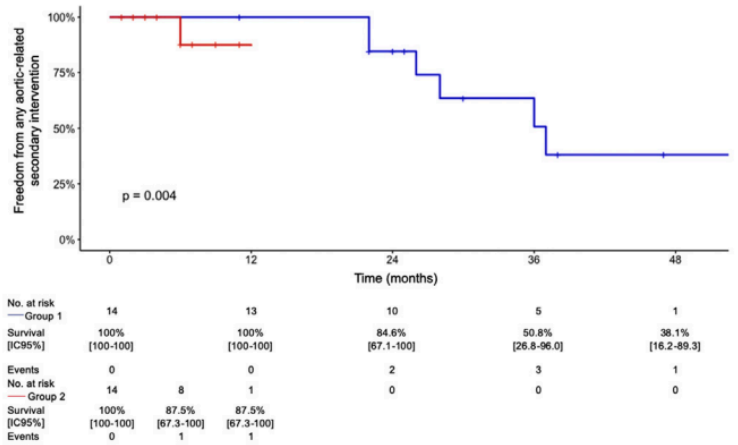


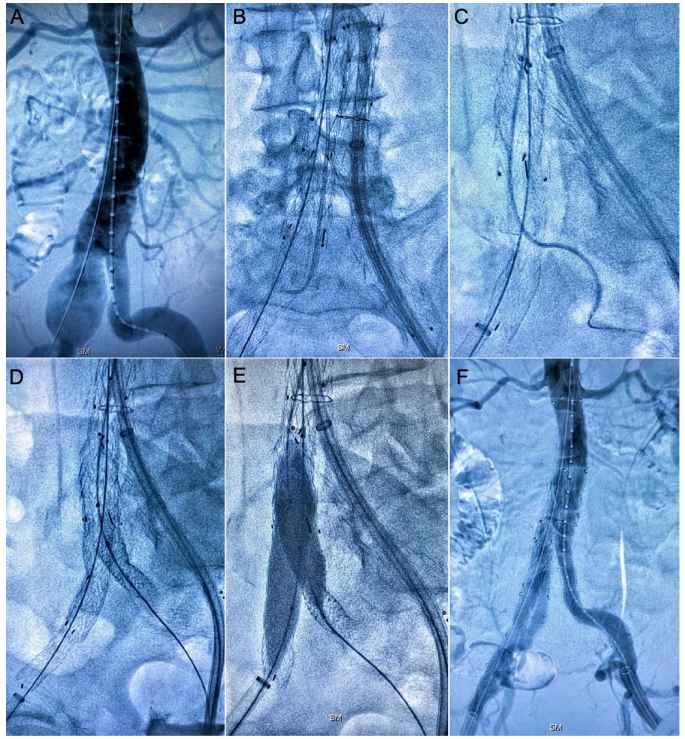
Fig 2. Cumulative Kaplan-Meier survival estimates of freedom from aortic-related secondary intervention of 28 patients treated using an iliac branch device (IBD) via upper limb access (group 1) or an "up-and-over" transfemoral technique (group 2) for type Ib endoleaks. *IC95%*, 95% Confidence interval.

EVAR FIRST / IPSI IBE

Clinical Investigation

Technical Feasibility and Safety of a Snare-Less, EVAR–First Technique for Iliac Branch Endoprosthesis

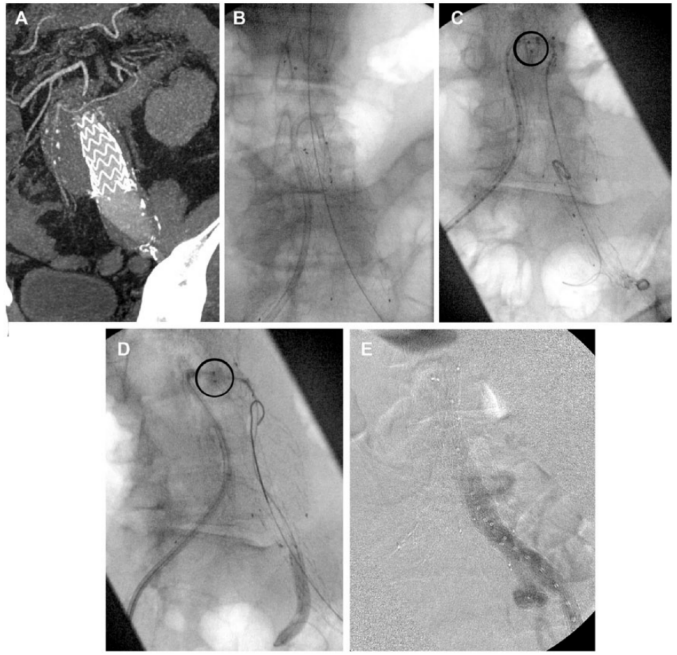
Julia Fayanne Chen, MD, MPH[1], Sarah Ann Loh, MD[2], Uwe Fischer, MD[2], and Naiem Nassiri, MD[2,3,4]



Endovascular Aneurysm Repair

Implantation of an Iliac Branch Device After EVAR via a Femoral Approach Using a Steerable Sheath

Alexander Oberhuber, MD, Mansur Duran, MD, Neslihan Ertaş, MD, Florian Simon, MD, and Hubert Schelzig, MD

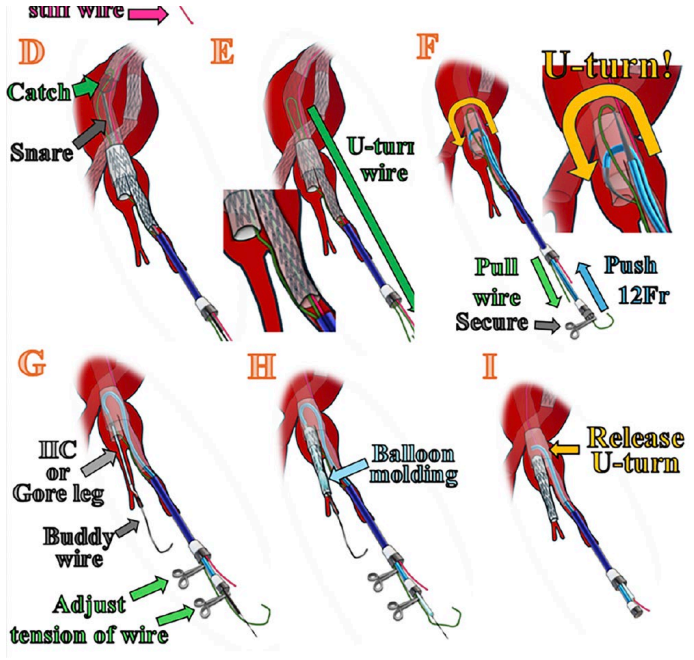


U-turn Dryseal sheath technique for additional Gore Iliac Branch Endoprosthesis placement

Annals of Vascular Surgery - Brief Reports and Innovations 4 (2

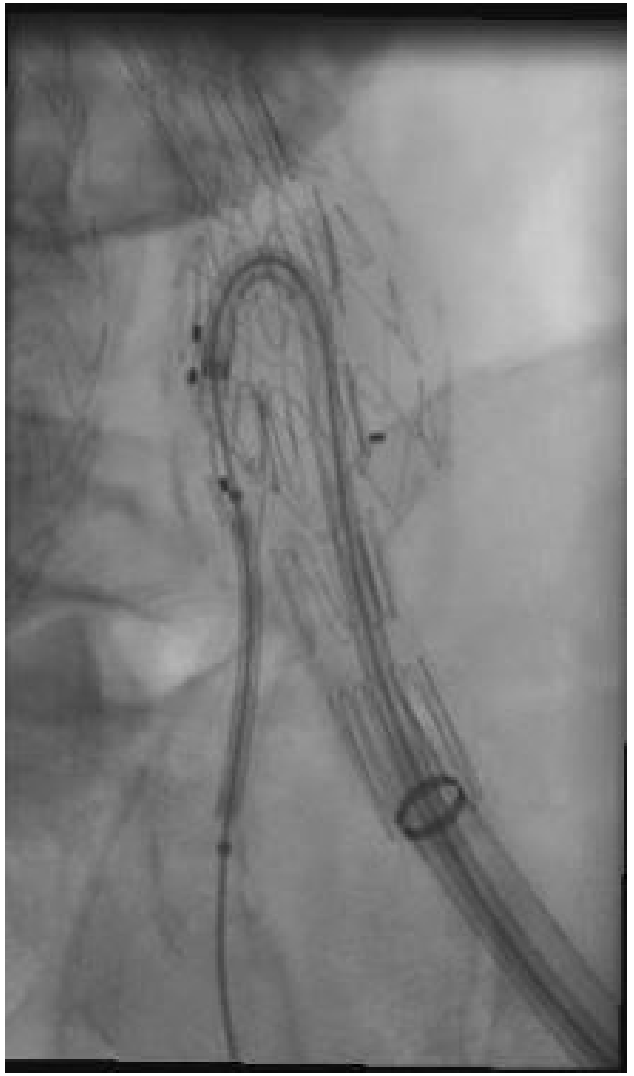
Yuta Tajima*, Yoshihisa Tamate, Kentaro Akabane, Shuji Toyama, Tetsuo Watanabe

Department of Cardiovascular Surgery, Sendai City Hospital, Miyagi, Japan



IPSI IBE: TRICKS

- Typically only use with Cook ZBIS
  - Gore IBE bridging stent usually requires larger sheath
- Need to completely deploy IBE, then advance steerable sheath through ipsi side and KEEP STRAIGHT
- Use rim catheter to get ”up and over”
- Switch out for stiff wire (rosen)
- Advance stent into steerable sheath
- Advance sheath and torque once stent within it

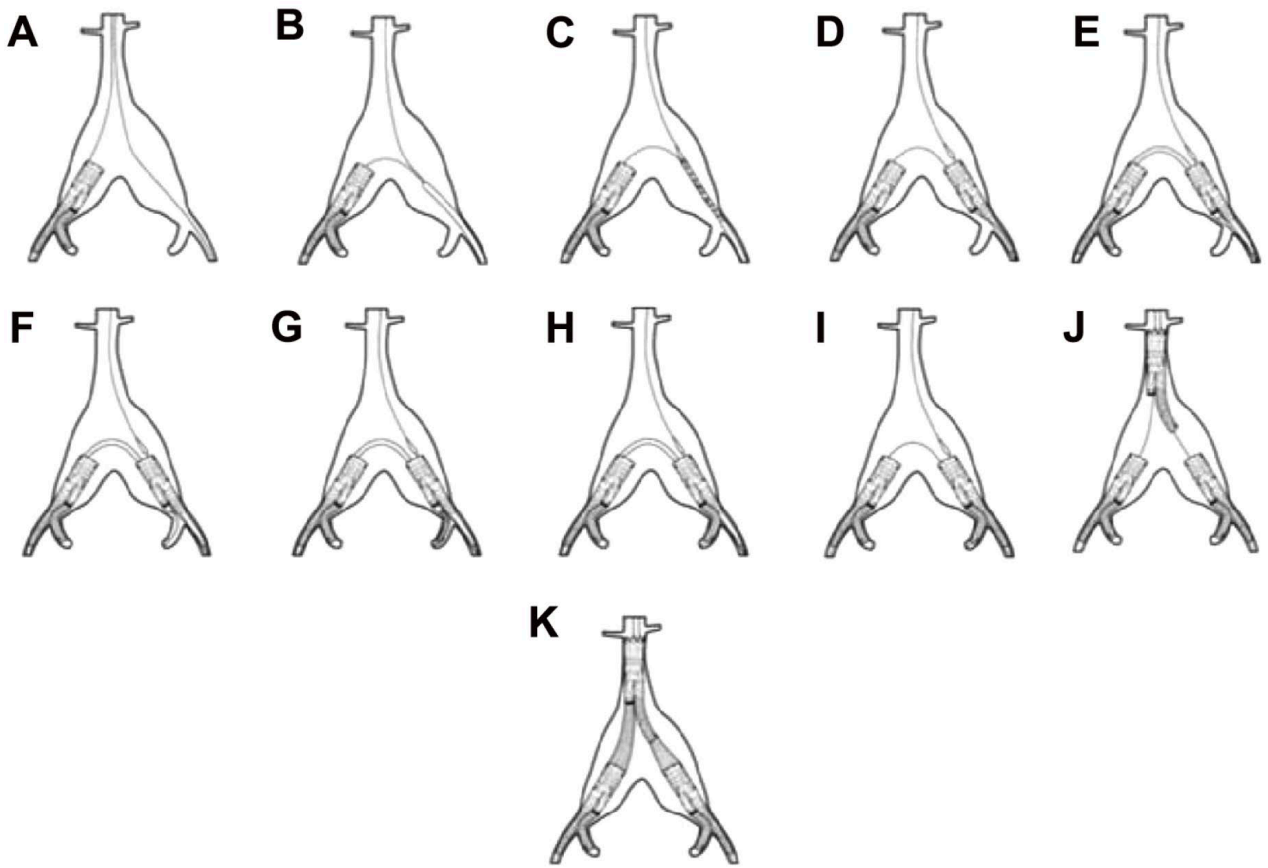


Gore Iliac Branch Endoprosthesis for treatment of bilateral common iliac artery aneurysms

Check for updates

- 47

Thomas S. Maldonado, MD,[a] Nilo J. Mosquera, MD,[b] Peter Lin, MD,[c] Raffaello Bellosta, MD,[d] Michael Barfield, MD,[a] Albeir Moussa, MD,[e] Robert Rhee, MD,[f] Marc L. Schermerhorn, MD,[g] Jeffrey Weinberger, MD,[h] Marald Wikkeling, MD,[i] Jan Heyligers, MD,[j] Frank J. Veith, MD,[a] Ross Milner, MD,[k] *and* Michel P. J. Reijnen, MD,[l] on behalf of the Gore Bilateral IBE Study Group,* *New York and Brooklyn, NY; Ourense, Spain; Los Angeles, Calif; Brescia, Italy; Charleston, WVa; Boston, Mass; Indianapolis, Ind; Drachten, Tilburg, and Arnhem, The Netherlands; and Chicago, Ill*



Tips and Tricks

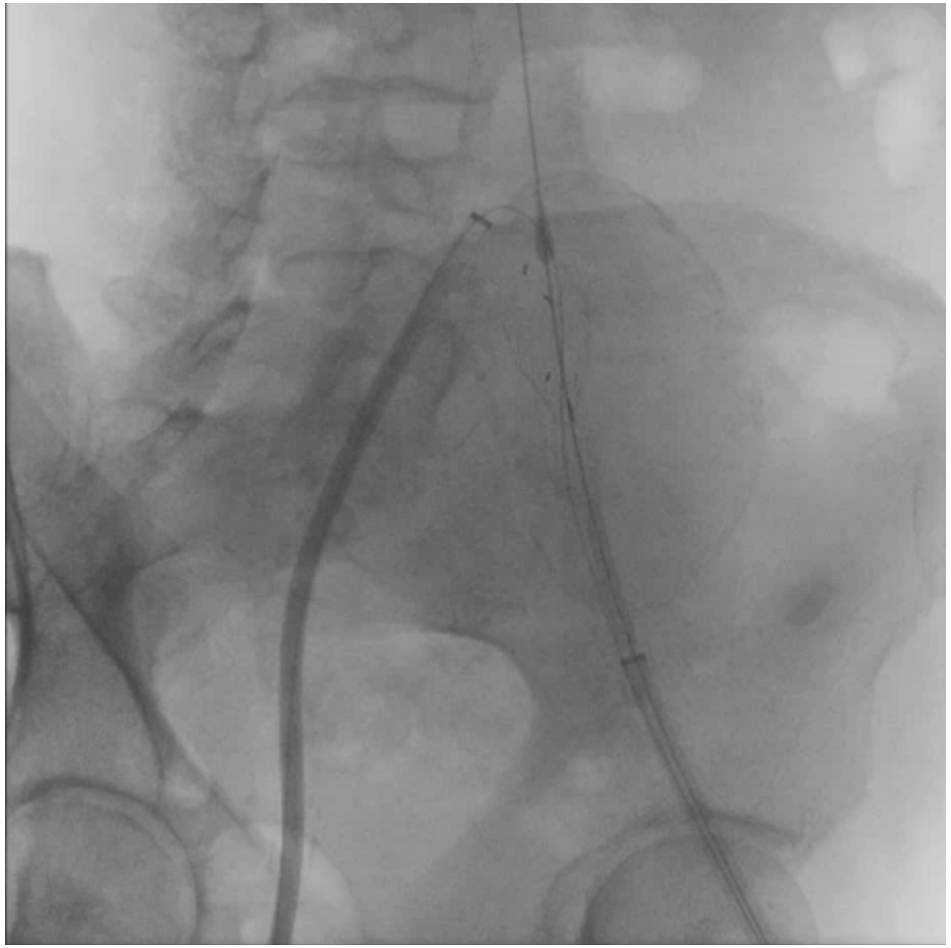
- 67 yo male, incidental finding of 4.0 cm AAA, 6.9cm L CIA and 5.5cm R CIA. Past medical history:
  - HTN, DLP, CAD/MI, Ef 40%, ICD, Afib (warfarin), ex-smoker

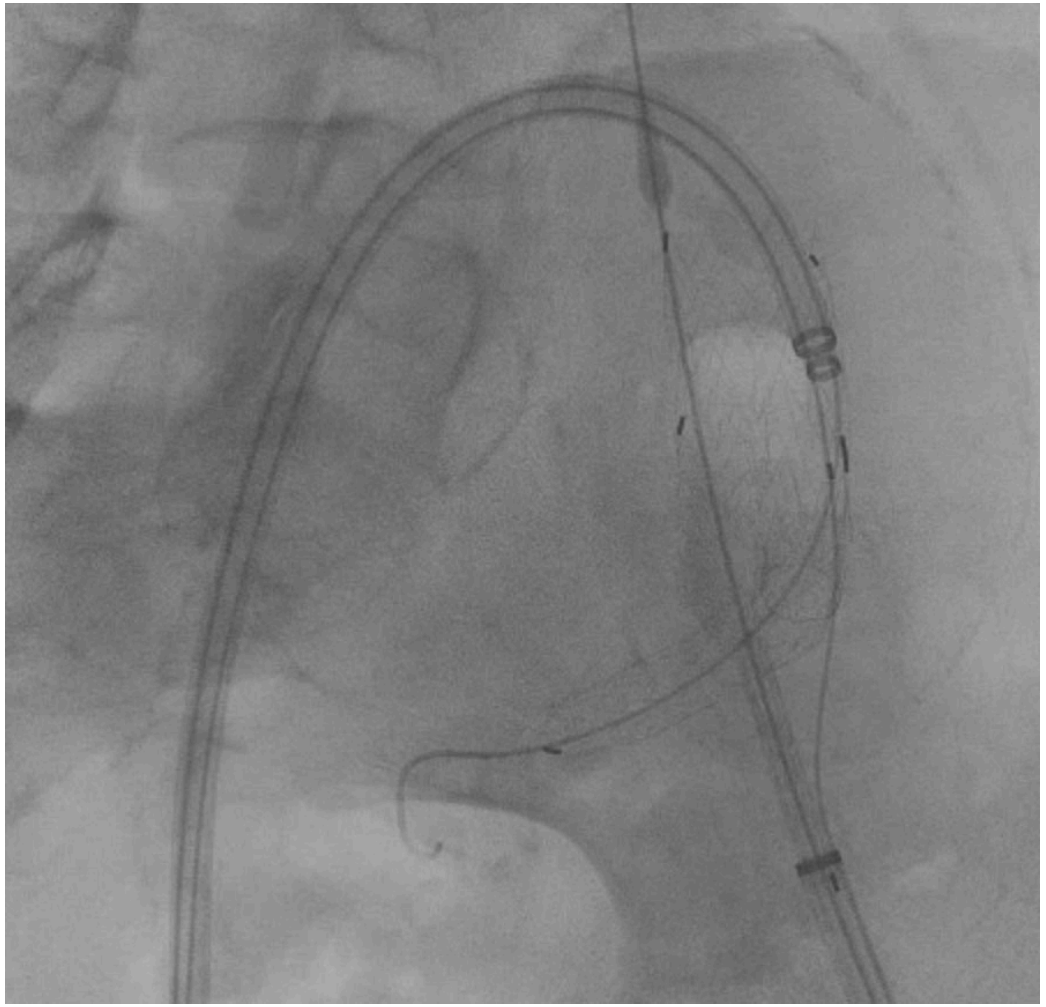
Tips and Tricks

- Insert IBD#1 in CIA with largest aneurysm:
  - Reduces risk of dislodgement when treating contralateral side

Tips and Tricks

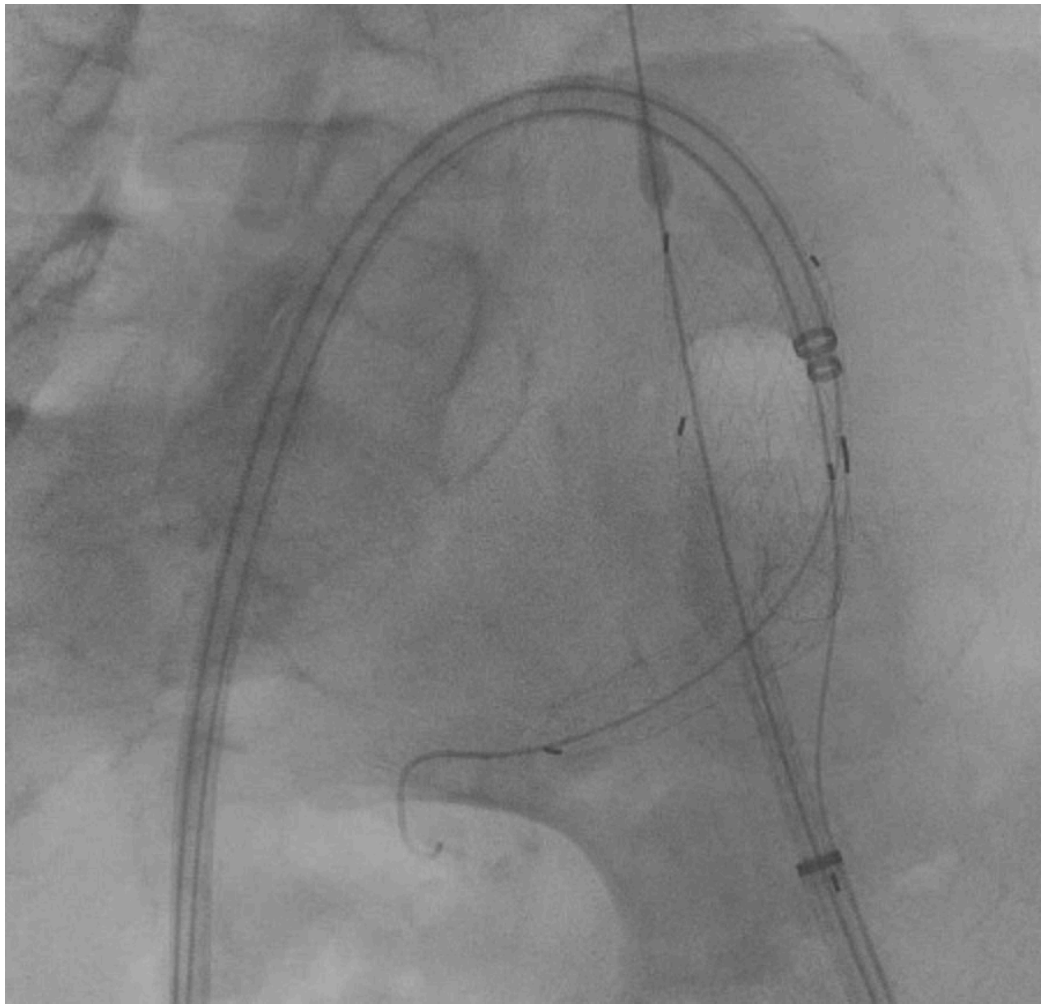
- Up and over through and through access

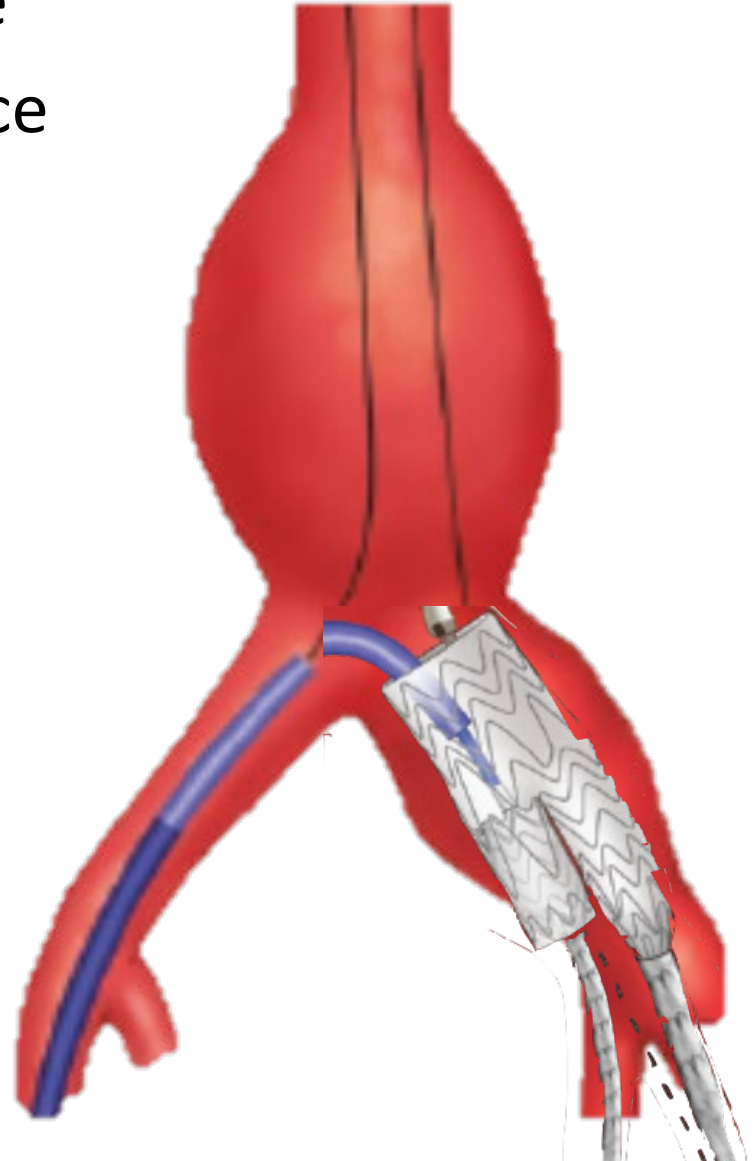




Tips and Tricks

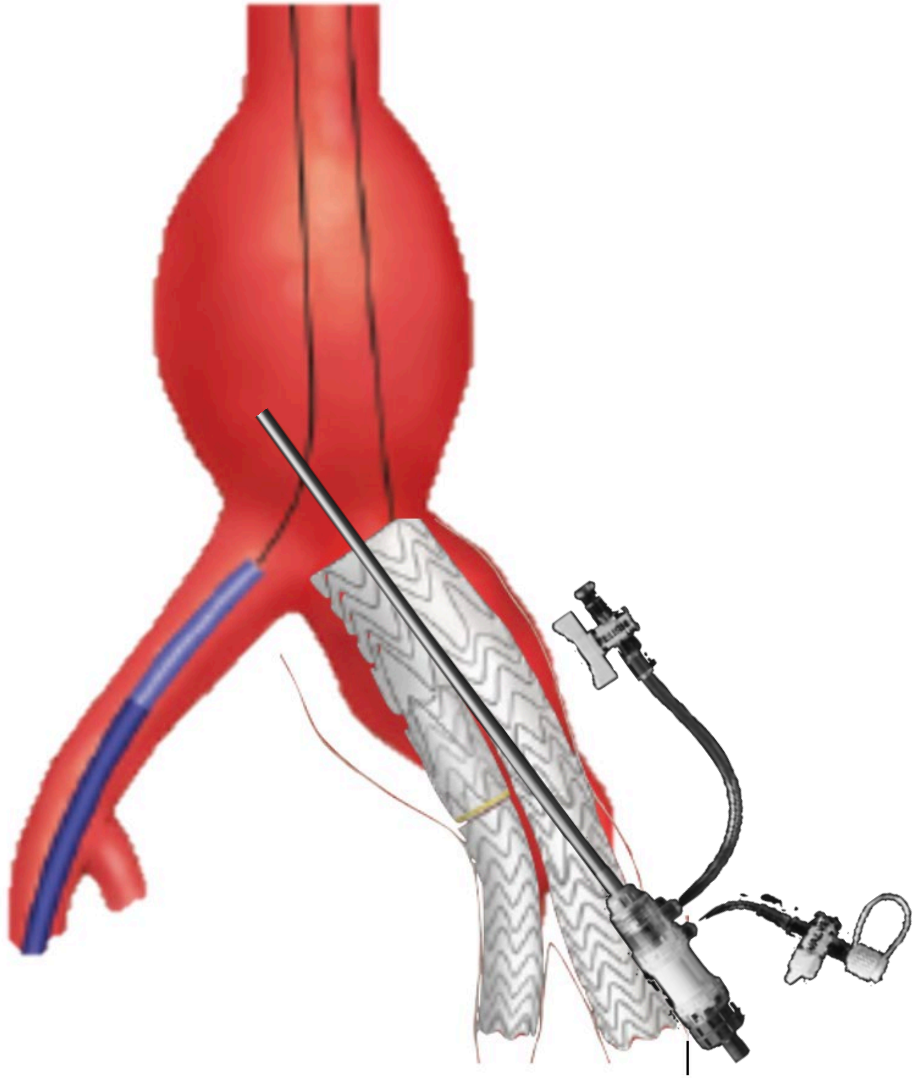
- Cannulate internal iliac gate from contra side
- SEAT on bifurcation internal iliac stent in place

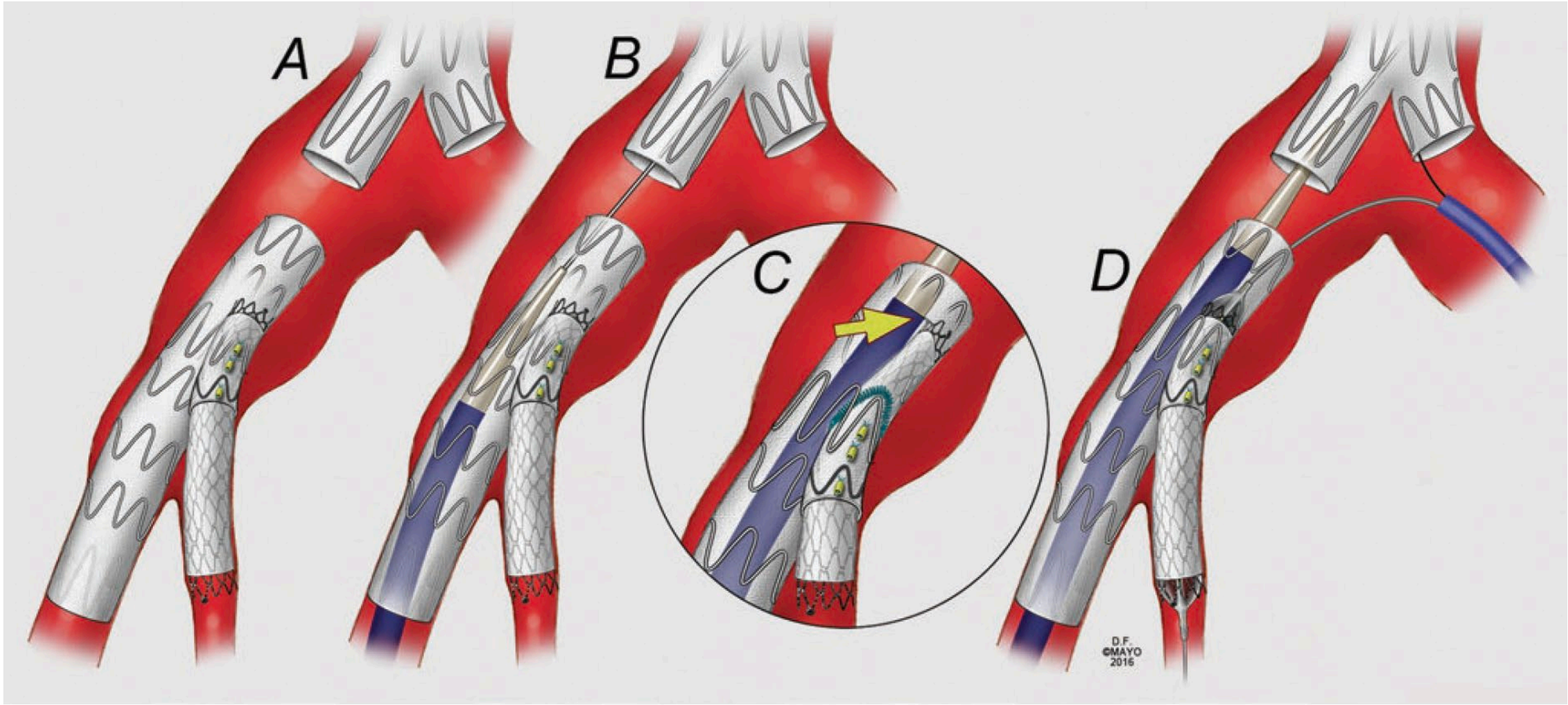




Tips and Tricks

- Complete deploy ipsi side, and advance 16 fr sheath through IBE

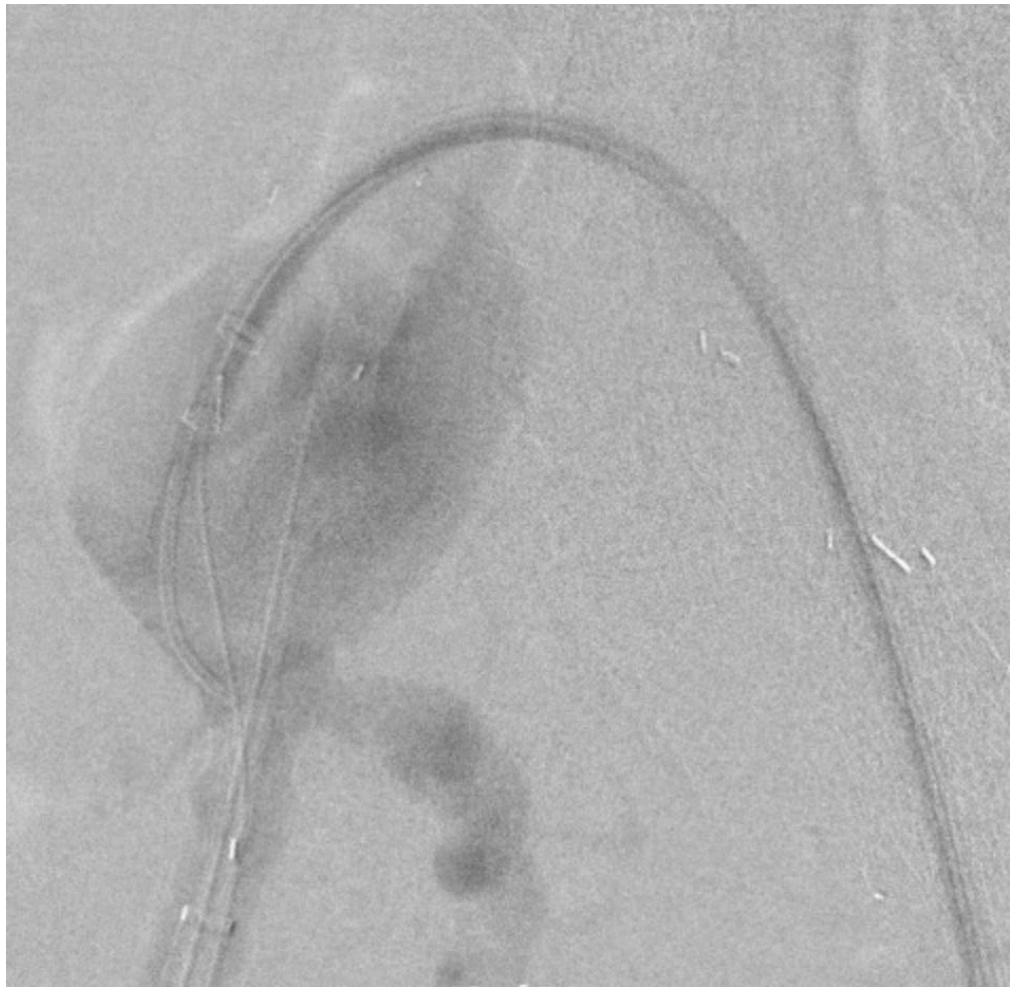


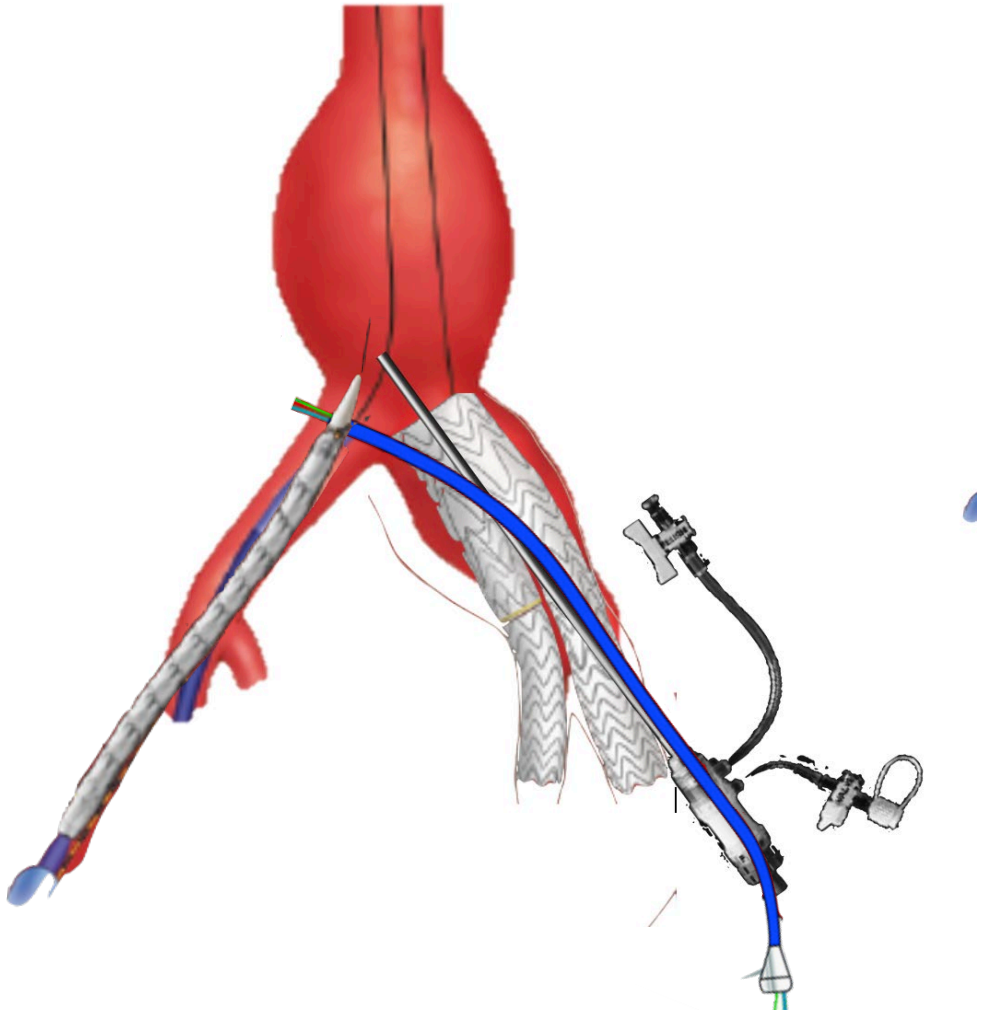


Oderich, Gustavo S., ed. *Endovascular aortic repair: current techniques with fenestrated, branched and parallel stent-grafts*. Springer, 2017

Tips and Tricks

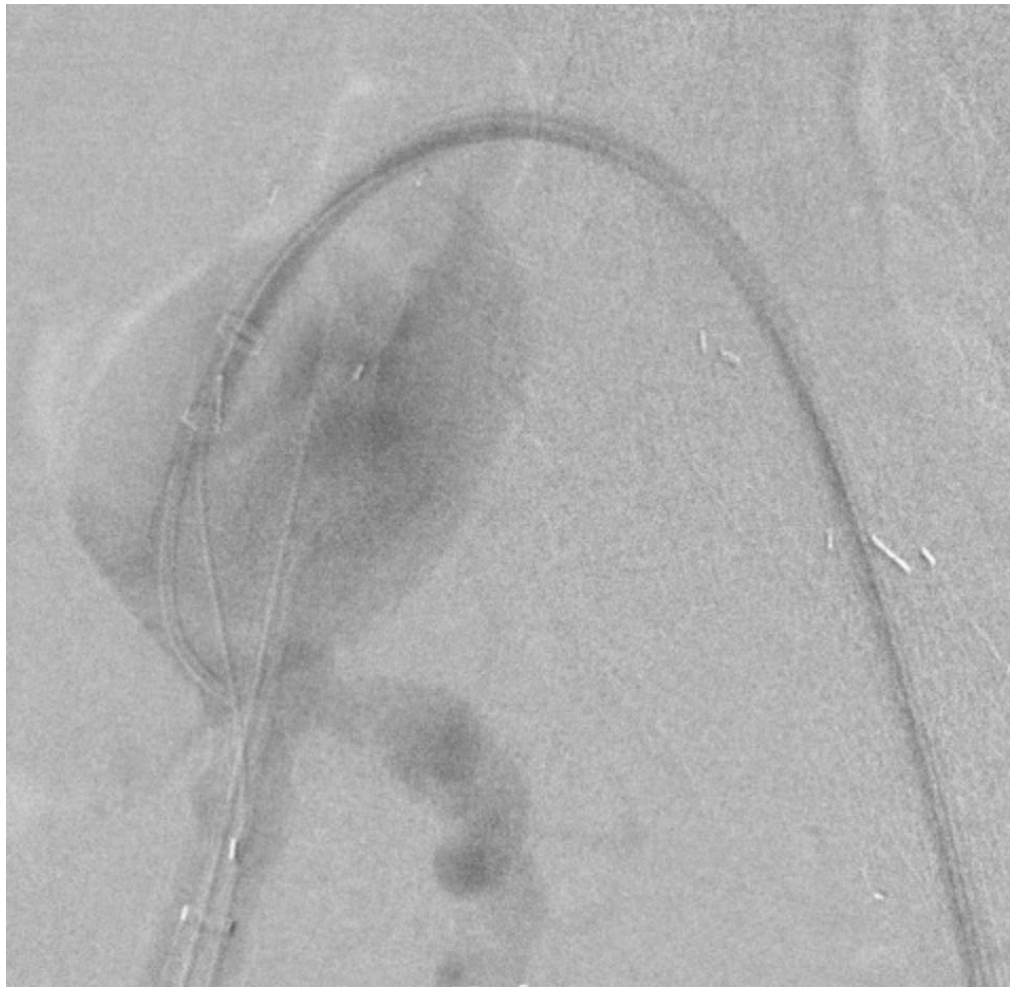
- Insert 12fr dryseal in 16 dryseal on IBD#1 side
- Insert IBD#2 on corresponding side

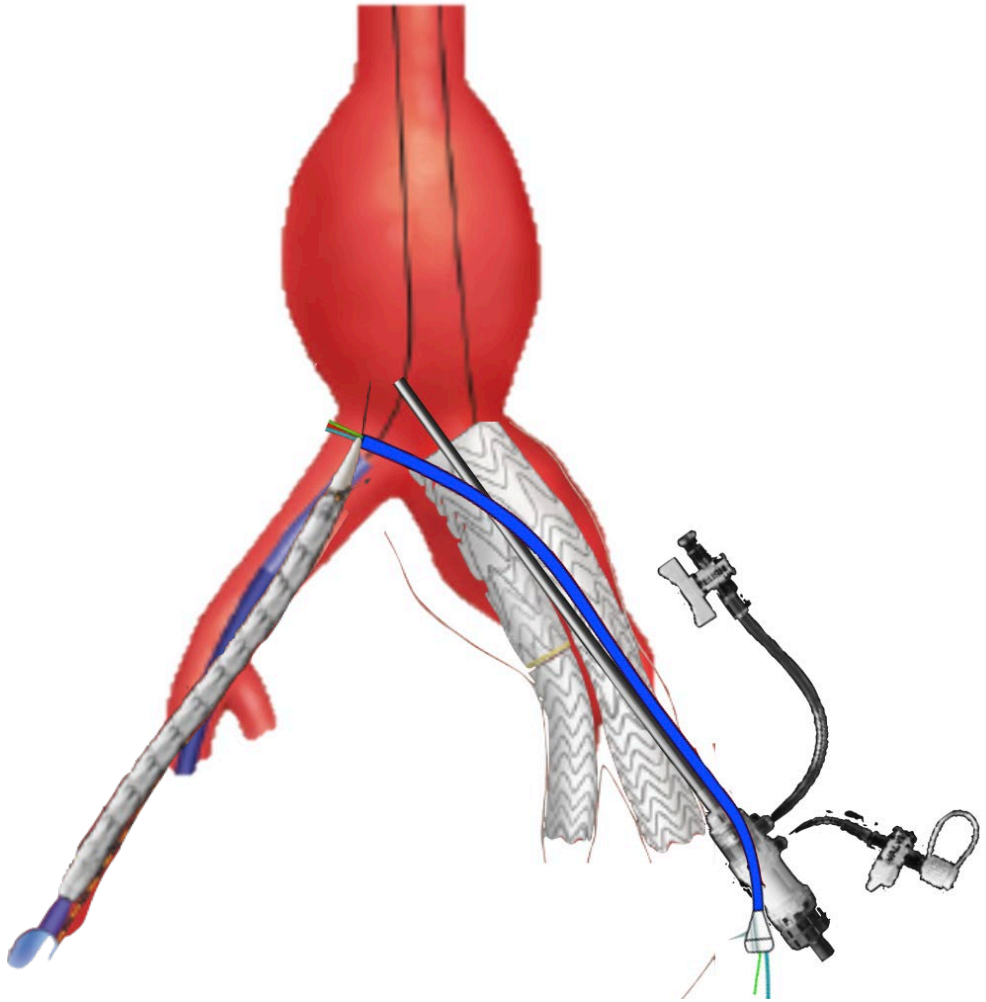




Tips and Tricks

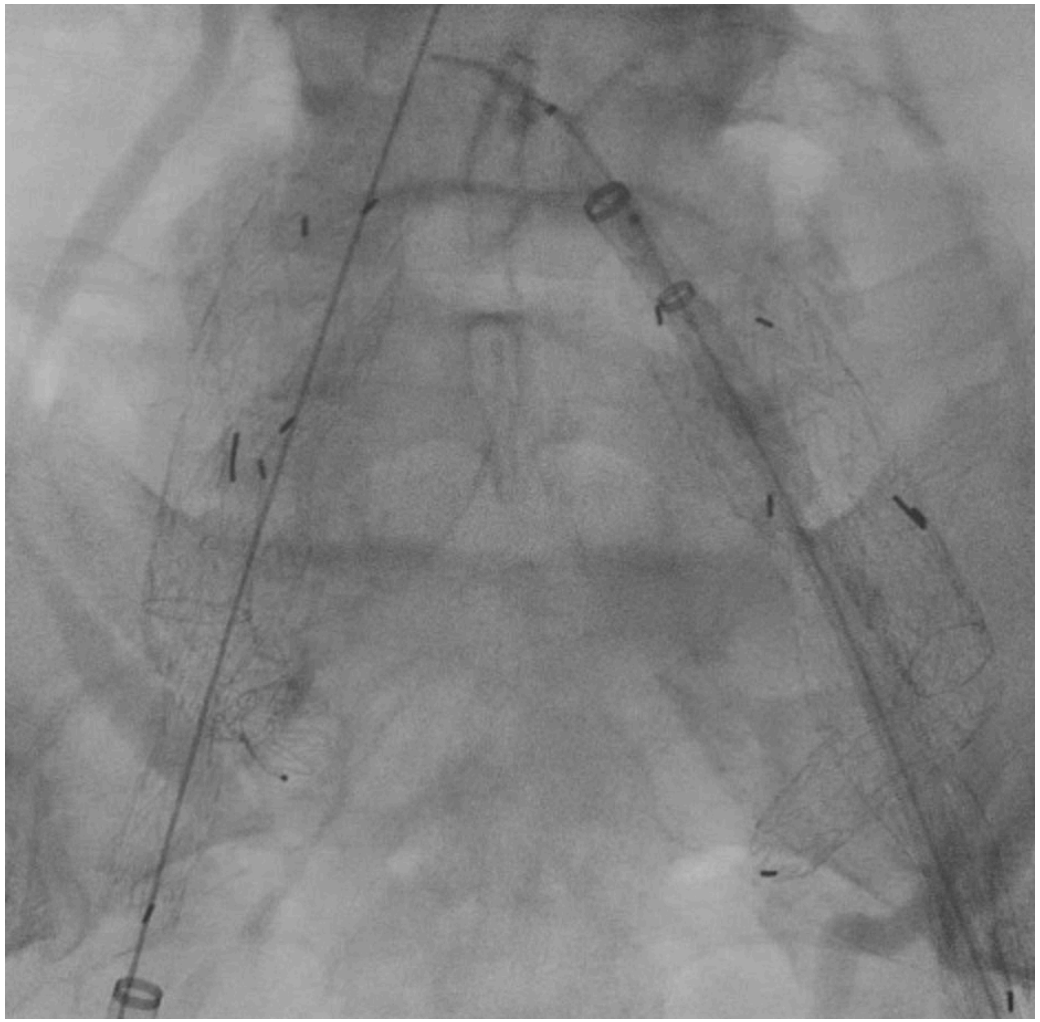
- Insert 12fr dryseal in 16 dryseal on IBD#1 side
- Insert IBD#2 on corresponding side

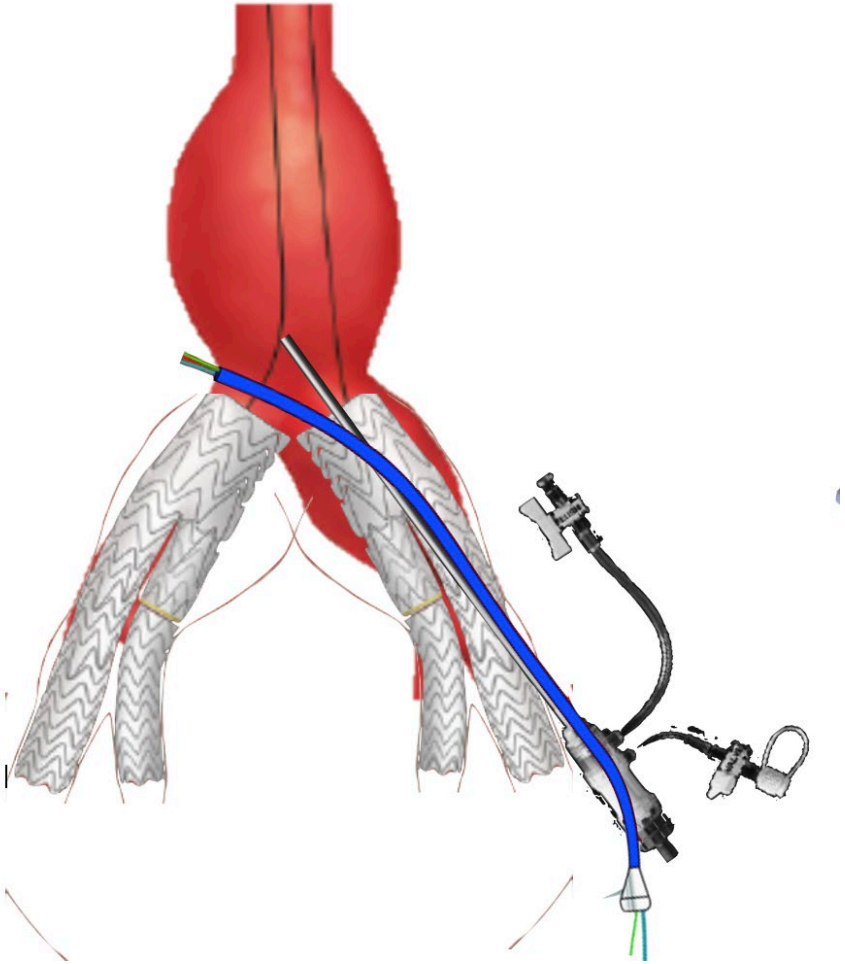




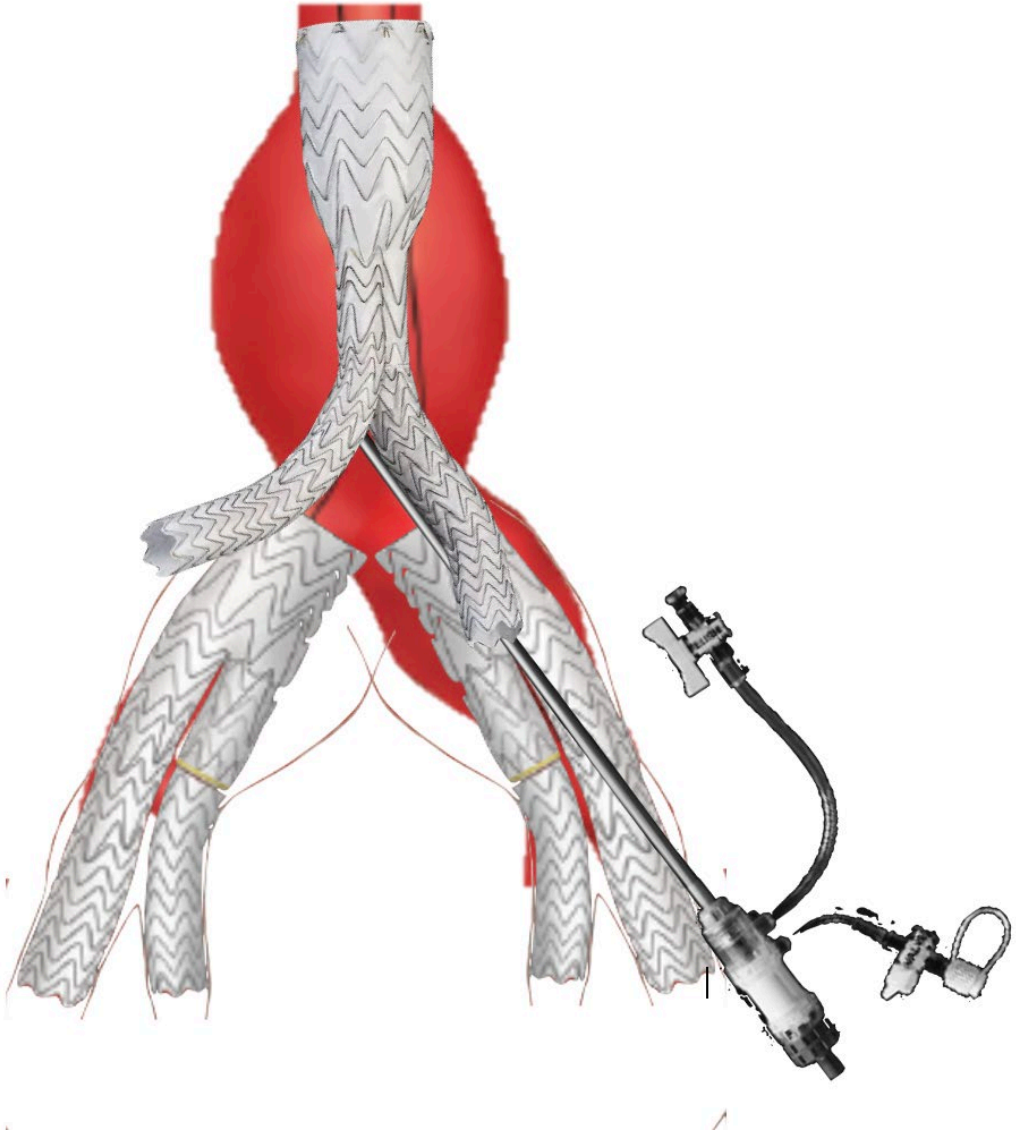
Tips and Tricks

- Deploy IBD#2





Tips and Tricks



- completion

CONCLUSIONS

- Bilateral IBD is preferable in patients with bilateral iliac aneurysms and reasonable life expectancy
- Bilateral IBD is feasible through several techniques and relatively straightforward

- Thank you.