

Endovascular reconstruction without contrast medium for aortic bifurcation occlusive disease

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Disclosure

Speaker name:

Arnaud Kerzmann, MD

I have the following potential conflicts of interest to report:

- Consulting : Boston Scientific, BD, Artivion
- Employment in industry
- Stockholder of a healthcare company
- Owner of a healthcare company
- Other(s) : Grant/research support from Medicor, DMB Medical, Medtronic, Biotronik, iVascular
- I do not have any potential conflict of interest



Introduction

- The covered endovascular reconstruction of aortic bifurcation (CERAB) technique was introduced in 2009.¹
- The CERAB technique is a safe and effective endovascular treatment for aortic bifurcation occlusive disease.²

- Results³ :

technical success rate	30-day systemic complications	overall primary patency rate at 3 years	claudication primary patency rate at 3 years	TASC D primary patency rate at 3 years	secondary patency rate at 3 years
95,9 %	6,4 %	83,8 %	89,4 %	70,4 %	97 %

¹ Goverde PC, Grimme FA, Verbruggen PJ, Reijnen MM. Covered endovascular reconstruction of aortic bifurcation (CERAB) technique: a new approach in treating extensive aortoiliac occlusive disease. J Cardiovasc Surg. 2013;54(3):383-7.

² Ruffino MA, Konings TJ, Mees BM. Evolution of the covered endovascular reconstruction of the aortic bifurcation technique for complex aorto-iliac occlusive disease. J Cardiovasc Surg. 2023;64(4):382-388.

³ Bontinis V, Bontinis A, Giannopoulos A, Manaki V, Kontes I, Papas T, Giannakopoulos NN, Ktenidis K. Covered endovascular reconstruction of the aortic bifurcation: A systematic review aggregated data and individual participant data meta-analysis. J Vasc Surg. 2024;79(6):1525-1535.



Introduction

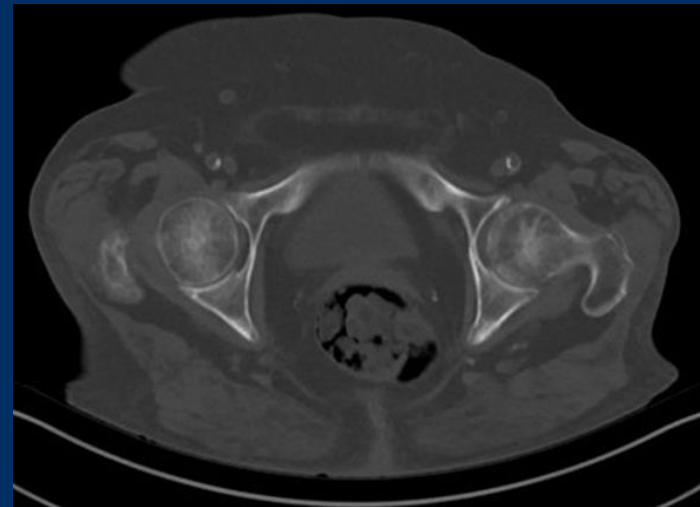
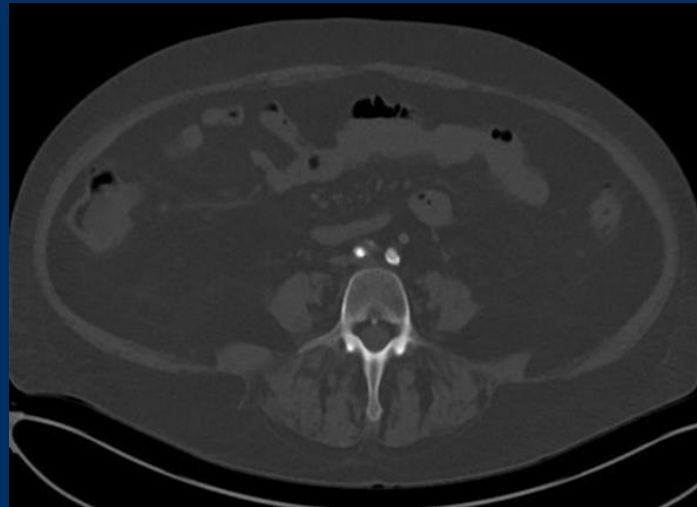
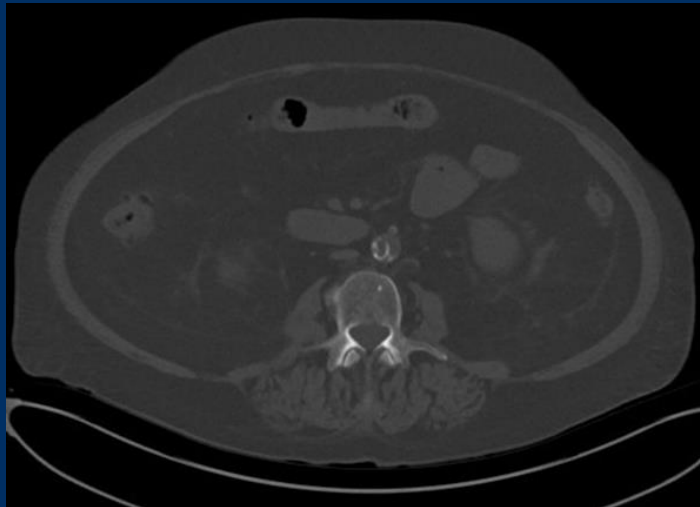
- Contrast media such iodinated agents and CO₂ are used to perform the CERAB technique.
- Some patients have chronic kidney disease or iodine allergy, what is against the use of iodinated contrast medium.
- CO₂ angiography is not always available.
- Aim : to evaluate the feasibility of the CERAB technique with intravascular ultrasound (IVUS) and fluoroscopy without contrast medium.

Patient history

- 73-year-old woman
- Rutherford stage 3 left limb peripheral arterial disease (PAD)
- walking distance : 30 meters
- arterial hypertension, dyslipidemia, type 2 diabetes, no smoking
- physical examination :
 - palpable pulses on the right side
 - weak left femoral pulse
 - no palpable pulses at the left ankle
 - ABI = 1,1 on the right side
 - ABI = 0,5 on the left side

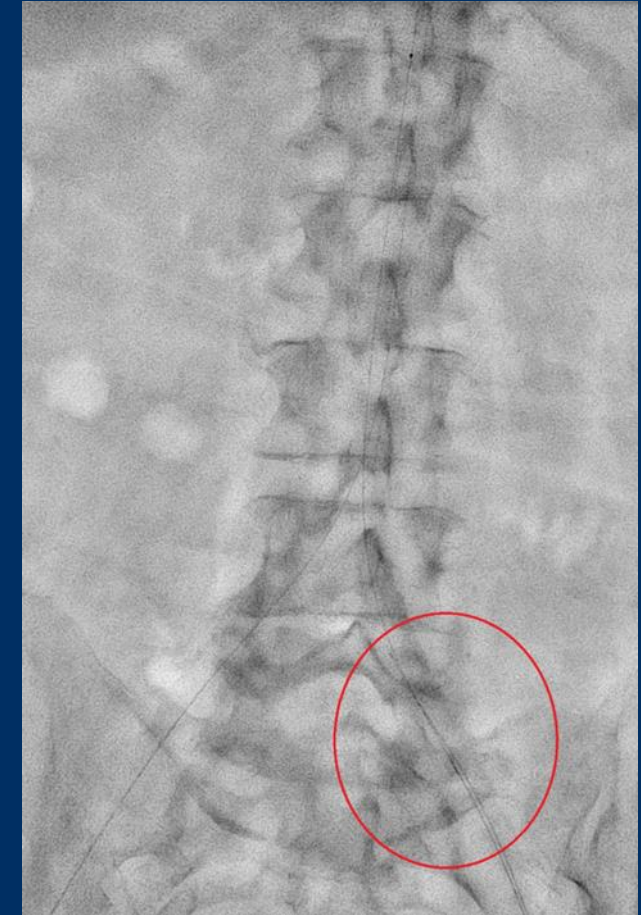
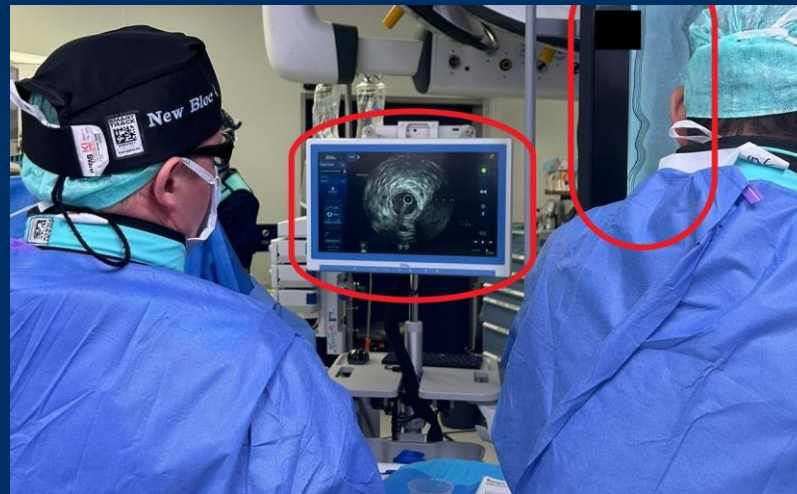
Patient history

- stage 5 chronic kidney disease with eGFR = 12 ml/min/1,73m²
- duplex scan : patent common femoral arteries with attenuated signal on the left side
- computed tomography without contrast medium :

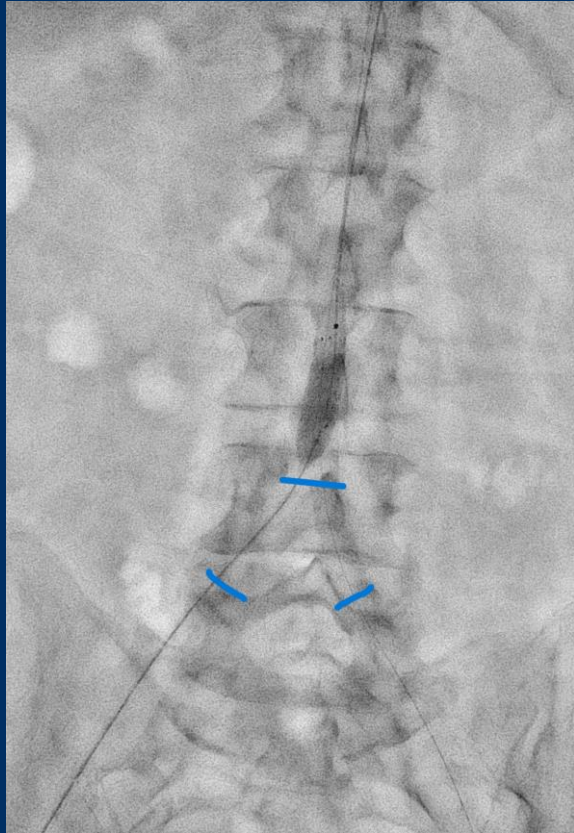


Patient history

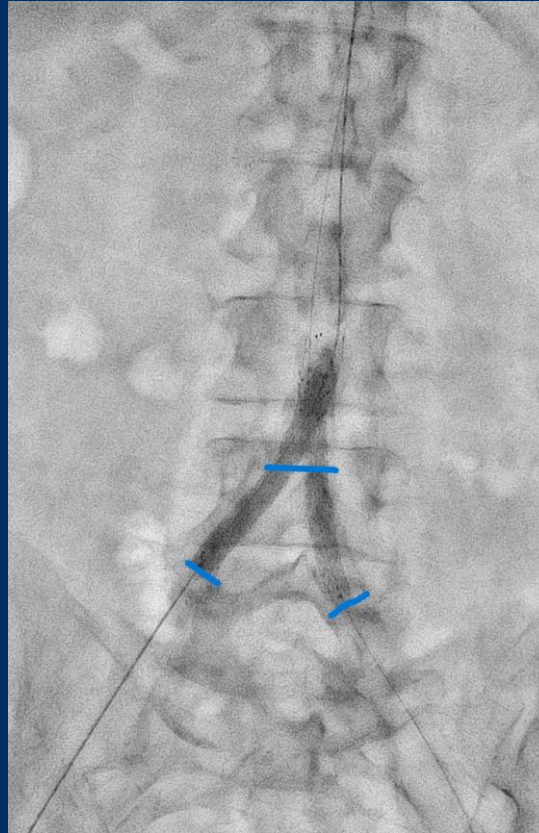
- strategy : CERAB under fluoroscopy, without contrast medium and assisted by IVUS under local anesthesia
- sizing was based on CT and IVUS images
- IVUS was used to identify the level of the aortic bifurcation and of the iliac bifurcations
- those levels were sketched on the fluoroscopy screen



Patient history



covered stent 10-27
(post-dilation with
12 mm balloon)



2 covered stents 7-57



Patient history

- the covered stents were deployed under fluoroscopy at the level drawn on the screen
- IVUS was used to check the stents position and opening
- no complication
- no eGFR further decline at short term
- at six months follow up : - Rutherford stage 0 PAD
 - ABI = 1 on the right side and 1,1 on the left
 - stents patent at duplex scan
 - start dialysis

Discussion

- Compared to angiography with contrast medium, IVUS offers a different view of the arterial lumen and wall.
- It makes possible in-situ sizing, control of the wire intraluminal position and angioplasty assessment with wire still in place allowing intraoperative correction.
- Addition of IVUS to angiography in PAD therapies improves stent patency and reduces reintervention rates.⁴
- When used for the technical assessment of endovascular repair of the aortic bifurcation with kissing stents or CERAB, it can detect technical defect not seen at angiography in 25%.⁵

⁴ Marulanda K, Genovese AE. Adjunctive utilization of intravascular ultrasound in peripheral arterial disease treatment. *Ann Vasc Surg.* 2024;107:195-207.

⁵ Antonello M, Piazza M, Menara S, Colacchio EC, Grego F, Menegolo M, Squizzato F. Role of intravascular ultrasound for the technical assessment of endovascular reconstruction of the aortic bifurcation. *J Vasc Surg.* 2024;80(2):441-450.



Discussion

- Assessment of CERAB technique with IVUS⁵ :

technical defects
stent compression/residual stenosis
dissection at the landing site
residual thrombus at the landing site

best indications for IVUS
narrow aortic bifurcation
heavily calcified total occlusion

- The cost of IVUS is an issue, especially in the countries where there is no refund.

⁵ Antonello M, Piazza M, Menara S, Colacchio EC, Grego F, Menegolo M, Squizzato F. Role of intravascular ultrasound for the technical assessment of endovascular reconstruction of the aortic bifurcation. J Vasc Surg. 2024;80(2):441-450.

Conclusions

- Association of **IVUS with fluoroscopy** to perform percutaneous CERAB without contrast medium is feasible.
- By **avoiding contrast medium**, it is a good alternative to angiography with iodinated agents or CO₂.
- It allows to **identify potential technical defect**, not viewable with angiography.