

DEPARTMENT OF DIAGNOSTIC IMAGING, MOLECULAR  
IMAGING, INTERVENTIONAL RADIOLOGY AND RADIOTHERAPY



University of Rome "Tor Vergata"  
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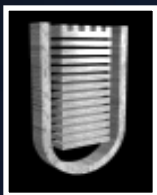
# Transcaval endoleak embolization (TCEE) of type I and II endoleaks occurring after endovascular abdominal aortic aneurysm repair (EVAR)

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DISCLOSURE STATEMENT  
THE AUTHORS HAVE NOTHING TO DISCLOSE

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THE WAVE OF INNOVATION



# Purpose

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To investigate the feasibility and effectiveness of transcaval endoleak embolization (TCEE) of type Ia, type II and a combination of type Ia and type II (Ia-II) endoleaks occurring after endovascular repair (EVAR) of abdominal aortic aneurysm (AAA).

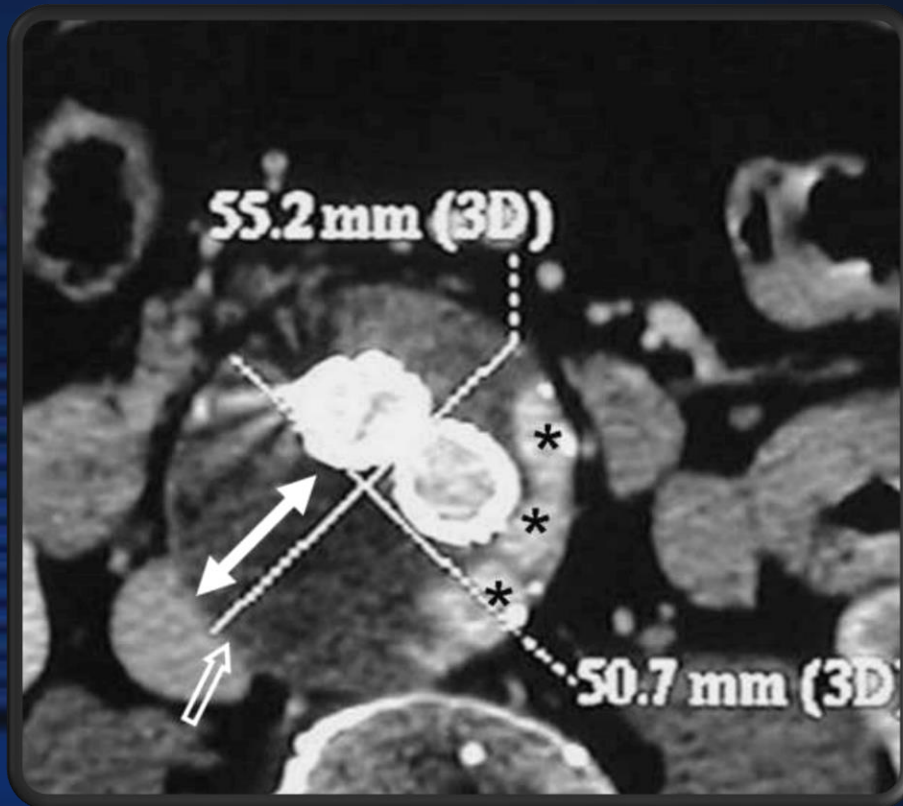
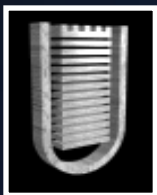


Fig 1 CTA demonstrates the presence of type II endoleak after EVAR. The venous sac is adherent to the aneurysm sac (arrow) and there is a sufficient space between the aneurysm wall and the endograft (double arrow).

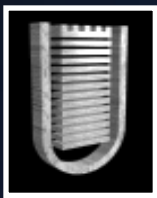


# Materials and Methods - 1



Fourteen patients (mean age  $71.6 \pm 7.9$ , range 69-85) with type Ia, II and Ia-II endoleaks, aneurysm sac enlargement and adhesion of the aneurysm sac to the inferior vena cava, diagnosed by computed tomography angiography (CTA), were treated by TCEE.

TCEE is an unconventional technique for the treatment of endoleaks after EVAR. It consists of the direct puncture of the aneurysm sac partially excluded, under fluoroscopic guidance, with transcaval access and subsequent embolization.



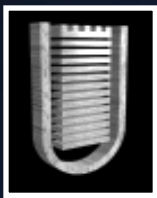
## Materials and Methods - 2



Type I endoleaks were embolized using coils while type II and Ia-II endoleaks were embolized with a combination of coils, acrylic glue and thrombin.

During the embolization the sac pressures were measured with a continuous in-line hemodynamic monitoring performed by the ACIST-System.

Follow-up was performed by clinical examination and computed tomography angiography (CTA) performed at 1 and 6 months postprocedurally.



# Results - 1

Primary success after TCEE endoleak treatment was achieved in all cases. Intrasac pressure dropped from  $63.6 \pm 15.2$  mmHg (range: 43-89) to  $7.8 \pm 2.3$  mmHg (range: 5-12).

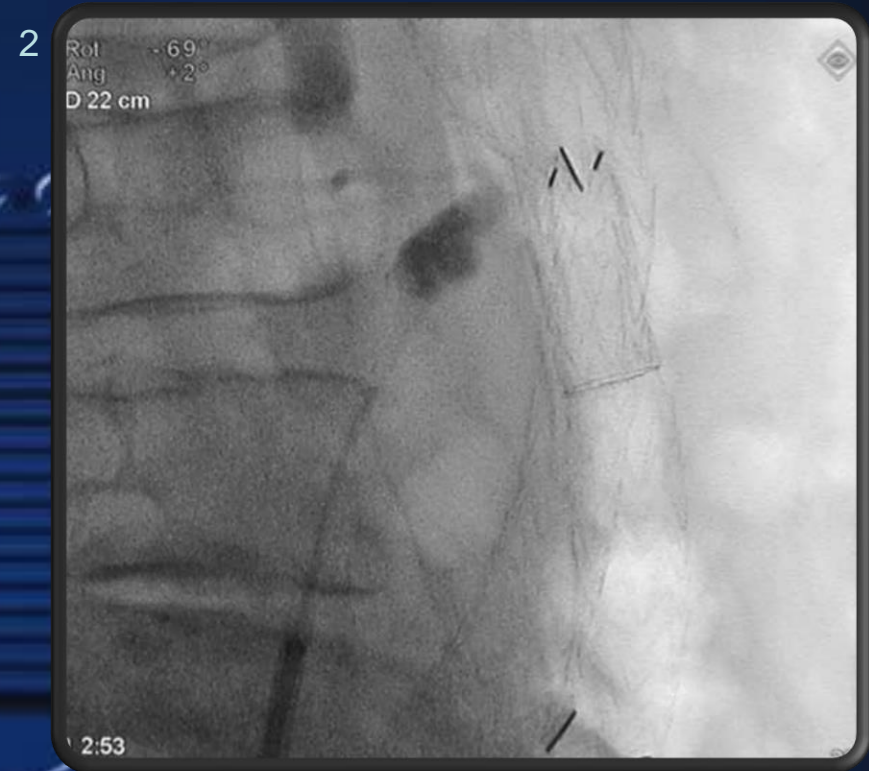
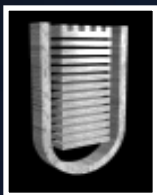


Fig.2 TCEE type II endoleak. Puncture of vena cava wall with trans-jugular kit after correct orientation, performed under fluoroscopic control, with injected contrast media into aneurismal sac.





## Results - 2

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During a mean  $9.9 \pm 4.5$  month (range:6-18) follow-up period, no aneurysm-related deaths, further increases in aneurism sac diameter or endoleak recurrences were observed.

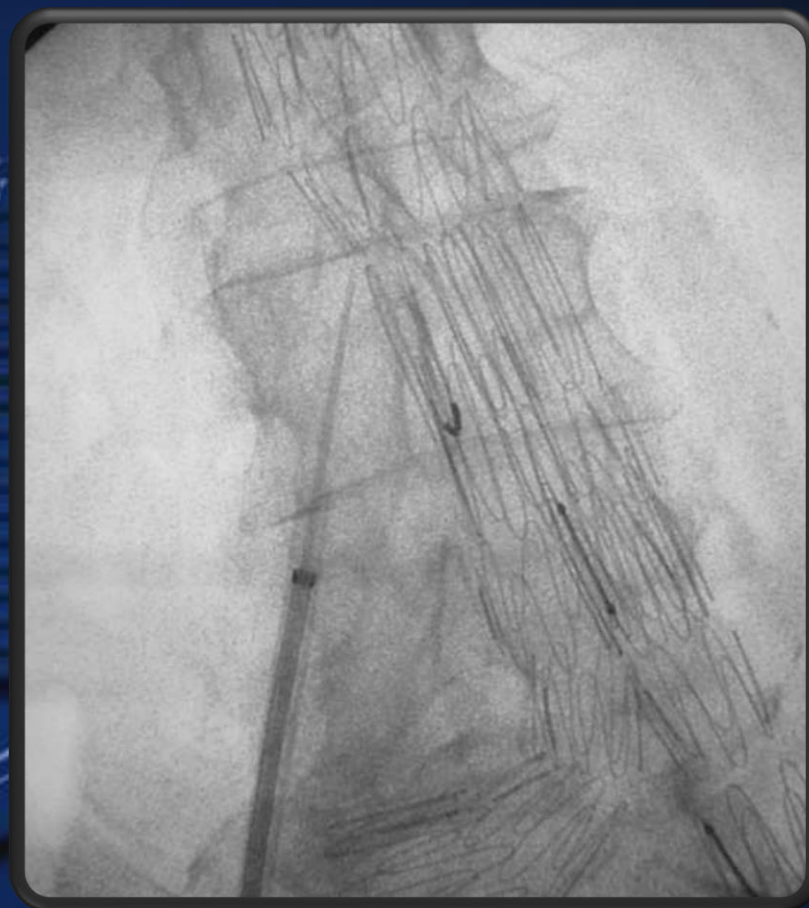
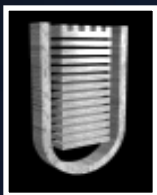
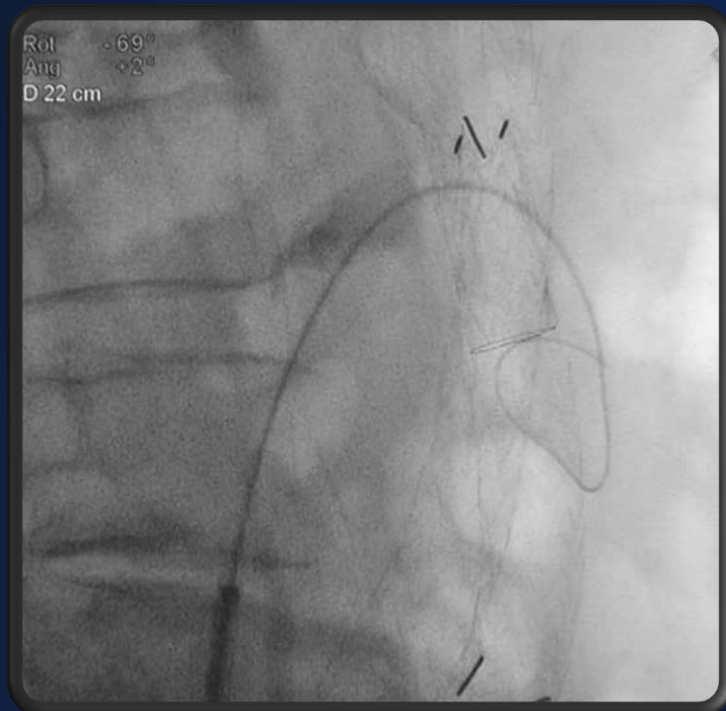


Fig.3 TCEE type I endoleak. Puncture of vena cava wall with transjugular kit after correct orientation, performed under fluoroscopic control.



## Results - 3

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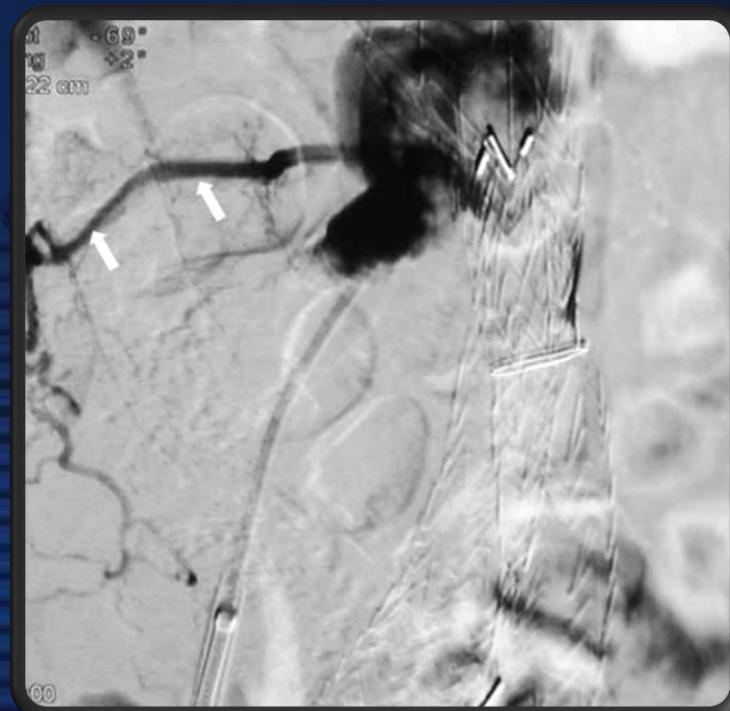
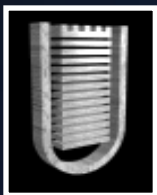


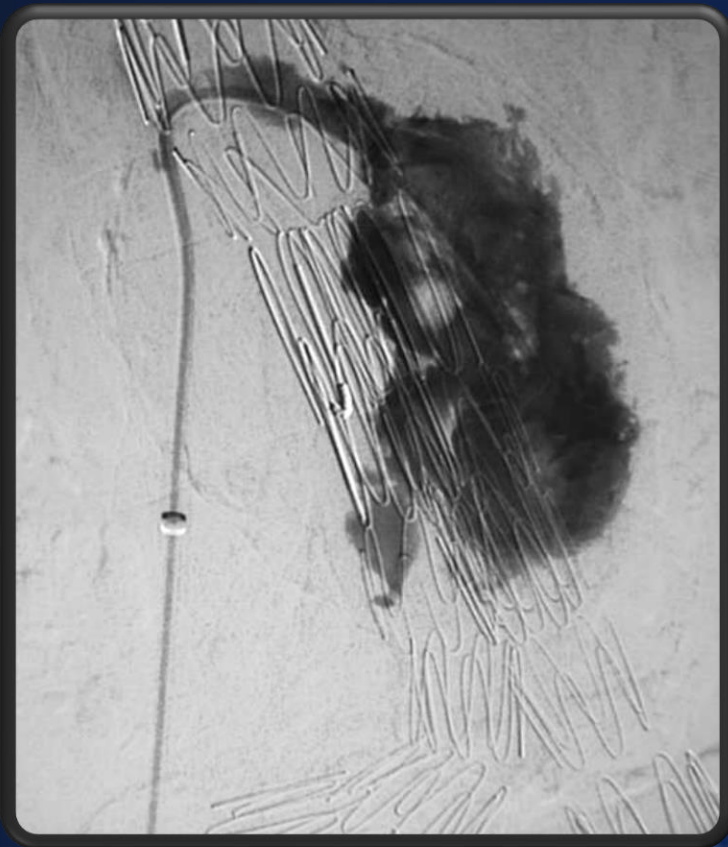
Fig.4 TCEE type II endoleak. A guidewire is introduced inside the aneurysm sac trough the transcaval approach. Afterwards a 5 F catheter was advanced.

Fig.5 TCEE type II endoleak. Diagnostic angiography highlights the contrast medium inside the aneurysm sac, which flows through lumbar arteries (arrow).



## Results - 4

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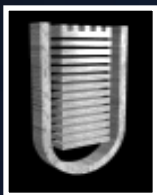
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Fig.6 TCEE type I endoleak. Diagnostic angiography highlights the contrast medium inside the aneurysm sac.

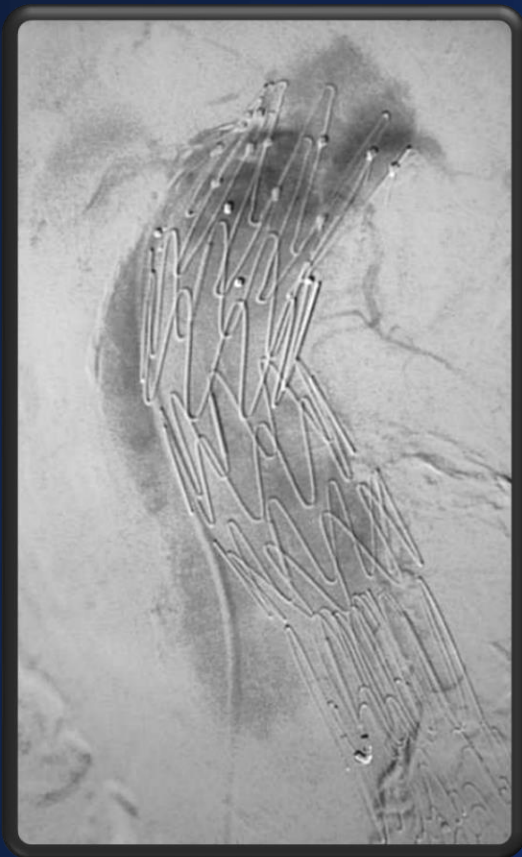
Fig. 7 TCEE type I endoleak. Under fluoroscopic control the guidewires are advanced in the sealing zone.





## Results - 5

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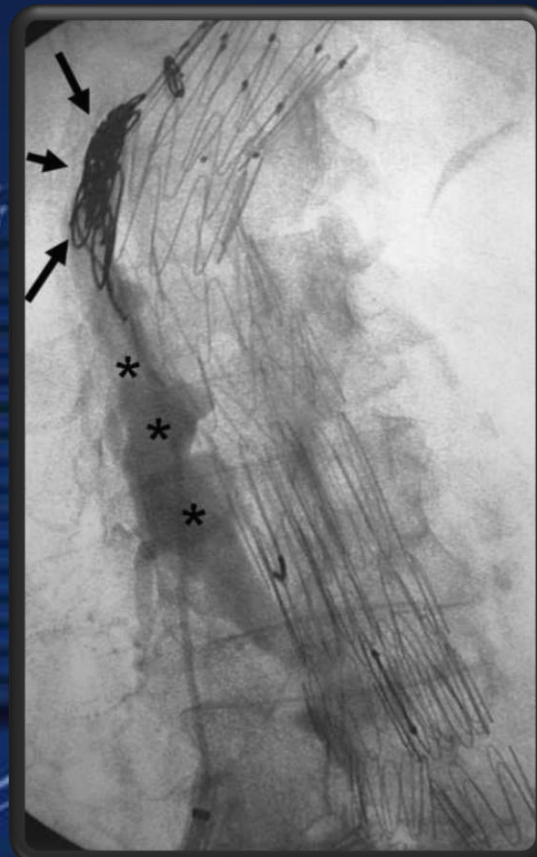
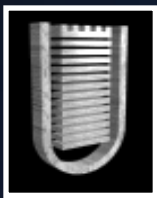


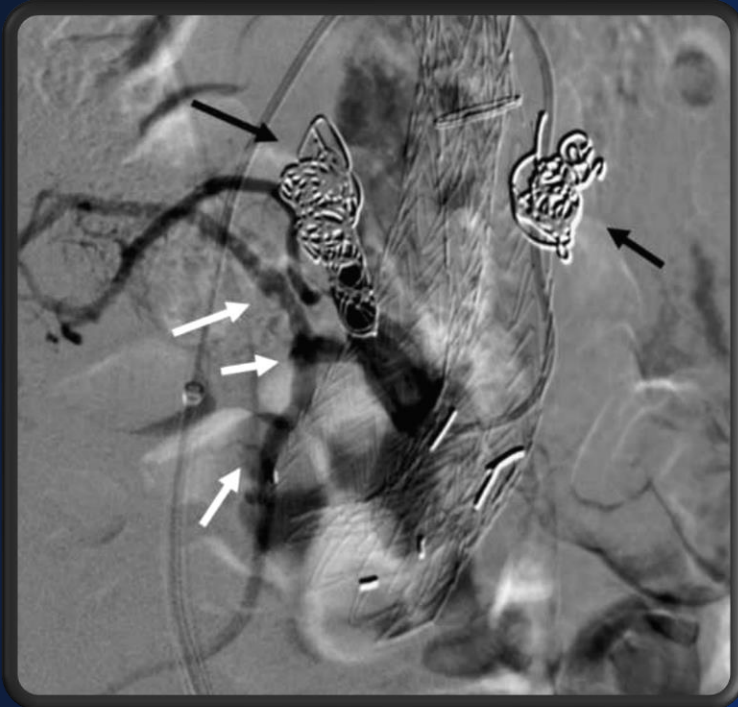
Fig. 8 TCEE type I endoleak. The catheter are advanced into the sealing zone and contrast media are gently injected to confirm the presence of type I endoleak.

Fig.9 After the transcaval embolization of type I endoleak, diagnostic angiography shows embolizing coils (arrows) in the sealing zone and stable contrast medium (asterisk) inside the sac.



## Results - 5

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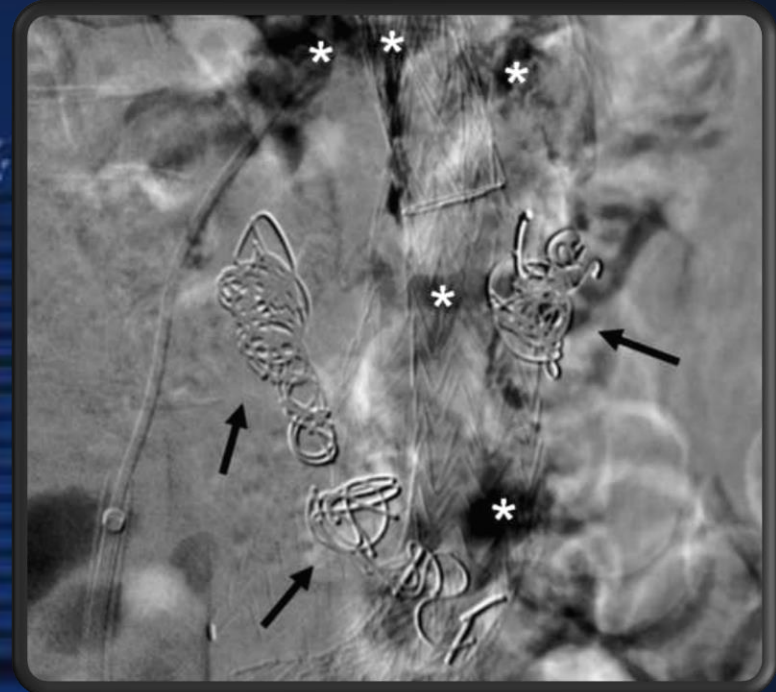
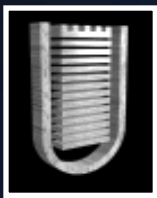


Fig.10 The angiographic control after transcaval embolization of type II endoleak, shows multiple (black arrows) and the persistence of endoleak demonstrated by rapid out-flow of contrast media through lumbar arteries (white arrows).

Fig.11 Final check after embolization of type II endoleak. After administering Glubran 2 acrylic glue mixed with Lipiodol and other embolizing coils (arrows), is documented resolution of contrast media out-flow through lumbar arteries with persistence contrast medium (asterisk) inside the sac.



# Conclusions - 1

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In this early experience TCEE of type Ia, II and Ia-II endoleaks with aneurysm sac enlargement is feasible, effective and safe.

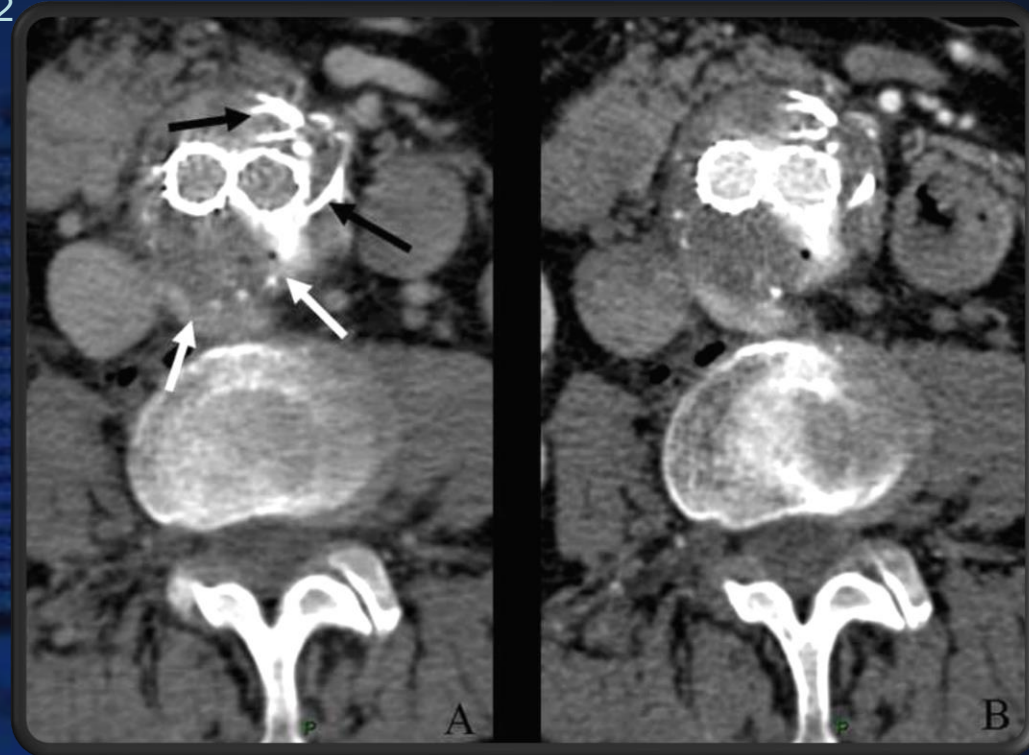
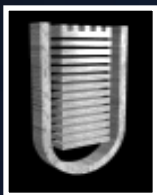


Fig.12 CTA after TCEE of type II endoleak. (A) Axial scan without contrast medium shows coils (black arrows) and stable contrast medium with gas bubbles inside the aneurysm sac (white arrows). (B) Axial scan at the same level of (A), in the arterial phase, demonstrates the absence of type II endoleak.





## Conclusions - 2

There were no complications in particular hemorrhagic complications or sac-cava fistulae.

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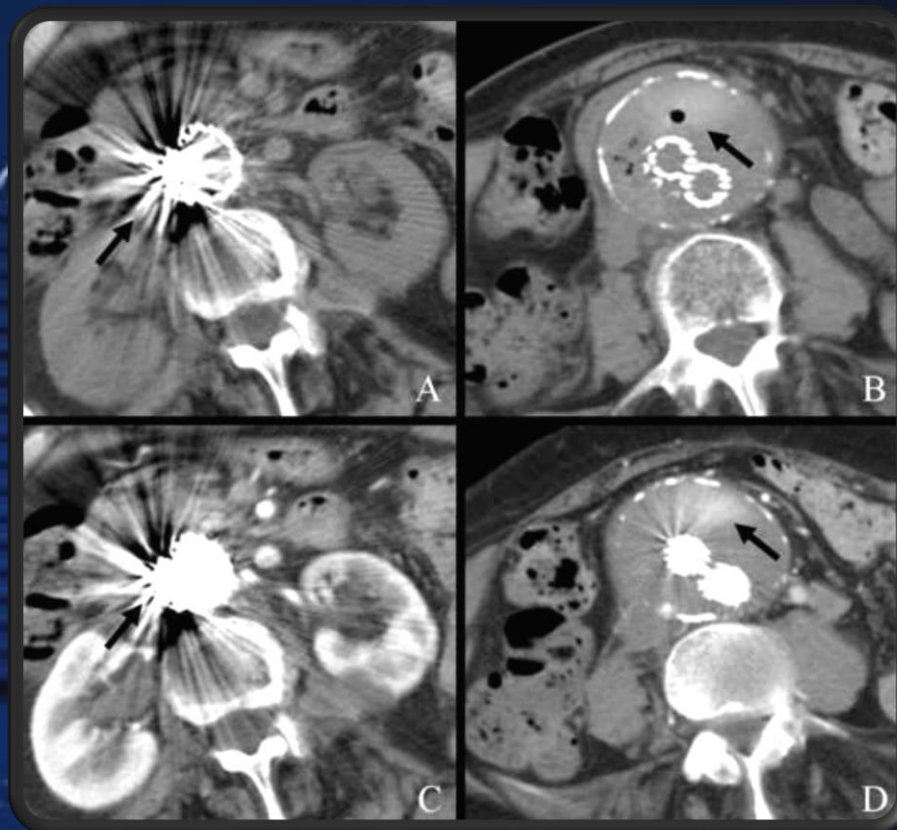


Fig.13 CTA after TCEE of type Ib endoleak. (A,B)Axial scan without contrast medium shows embolizing coil in the sealing zone and stable contrast medium with gas bubbles (arrow) inside the aneurysm sac, as a result of embolization treatment. (C,D) Scan in arterial phase shows coils and complete exclusion of the aneurysm sac.