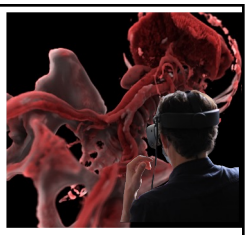
VEITH SYMPOSIUM
Connecting The Vascular Community

Use of Virtual Reality 3D visualization with a headset for preoperative optimization treatment of visceral aneurysm



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Disclosure

- I have no conflict of interest regarding this presentation
- Free partnership

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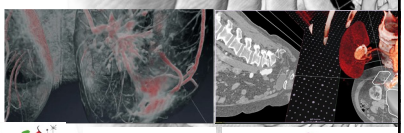
AVATAR MEDICAL ™

- 3D Virtual Reality medical image visualization system
- Headset and joystick



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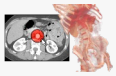
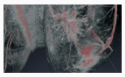
How does AVATAR MEDICAL work?

1 Upload DICOM image

2 Real-time Conversion of 100% of the DICOM image



3 Put the Headset
Use the joystick
Interact with AVATAR MEDICAL using Virtual Reality



Advanced dynamic filters For each speciality

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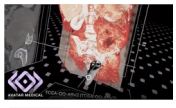
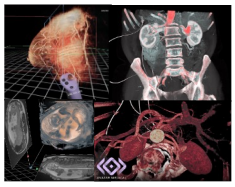
3D immersive visualization experience

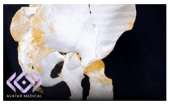
Versatile:
Bones, tumors, vessels, muscles, nerves, foetus etc.

Lossless:
100% of the data is visualized
Surgeons decide





Immersive:
Your medical image in 3D and VR



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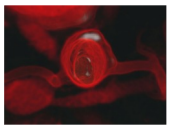
Aim of the study: Visceral artery aneurysms (VAA)

This study aimed to assess the influence of the AVATAR technology in VAA surgery to optimize treatment selection and surgical planning.



Improve Arterial visualization to decide the most accurate option between:
endovascular
Or open surgery

Afferent and efferent branches to plan aneurysm procedure

Method

- CT scans were analyzed successfully:
  - **1/ with standard 2D multiplanar reconstructions and**
  - **2/ with 3D VR reconstruction using a VR headset and joystick**

CT scan → Analyze and measure using 3D workstation → Visualize using AVATAR MEDICAL → Surgical decision

Method

- 10 patients with VAA were selected.
- 10 surgeons were each assigned to analyze three of these cases and were required to choose between managing the aneurysm via:
  - **open repair (OR) or**
  - **endovascular procedure**
- the surgeons answered a qualitative variable-based questionnaire.

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Case of visceral renal artery aneurysm

- 76 year old male,
- 31 mm asymptomatic right renal artery aneurysm (RRAA)

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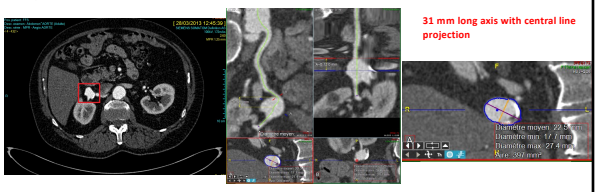
1/ analysis with standard 2D multiplanar reconstructions: Aquarius



31 mm long axis with central line projection

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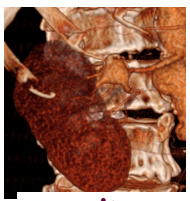
1/ RRAA 3D reconstruction standart Workstation: Aquarius



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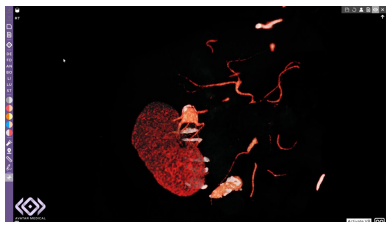
2/ with 3D VR reconstruction using a VR headset and joystick



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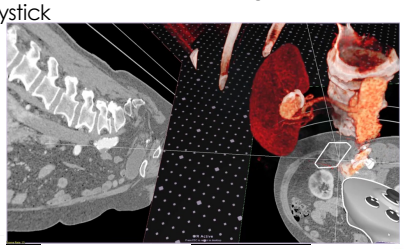
2/ with 3D VR reconstruction using a VR headset and joystick



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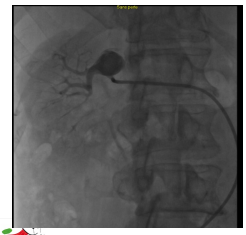
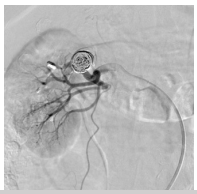
Endovascular exclusion result





RRAA completely excluded occlusion of 2 branches

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Results

- **We enrolled 10 patients (55-76 year-old) with VAA.**
  - 4 splenic arteries,
  - 2 renal arteries,
  - 1 celiac trunk extending to the splenic artery,
  - both splenic and renal arteries, and
  - 2 duodenopancreatic arch (one associated with celiac trunk occlusion).
- **All surgeons experienced enhanced:**
  - **The location,**
  - **Number and position of the collateral branches, and**
  - **diagnosis accuracy (70%, 100% and 70% respectively) using VR.**

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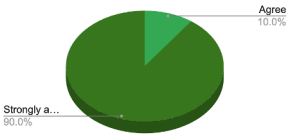
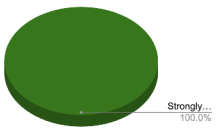
Better understanding of the anatomy

I can better analyze the anatomy of the aneurysm



I can better analyze the afferent and efferent branches



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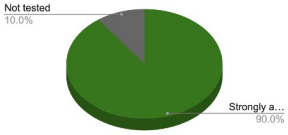
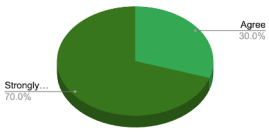
Impact on surgical decision

I have a better confidence in my choice for endovascular versus open surgery



I can better plan my surgical approach



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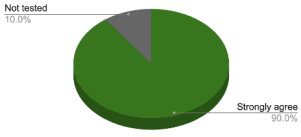
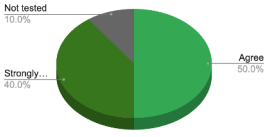
Going faster

I am faster to make a surgical decision



I think I will gain time in surgery



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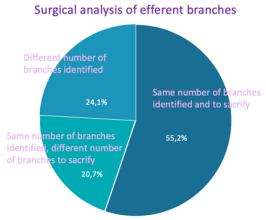
Results of the study

In 45% of cases the anatomical analysis was different with AVATAR

The choice of procedure (OR vs EP) was modified in 15% of cases after 3D VR analysis.



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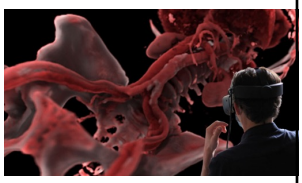
Conclusion

- This pilot study shows consistent results regarding the use of VR for preoperative evaluation of patients with VAA.
- The learning curve is short and the analysis process is not time-consuming.
- VR is a promising tool to optimize treatment selection (endovascular or OR).



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