Patient-specific computer simulation in transcatheter aortic valve implantation (TAVI) with the self-expanding Evolut R valve.
## The multicenter prospective TAVIguide Study

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Aims

- Patient-specific computer simulation assesses the interaction between the device & host and, thereby, predicts outcome (e.g. valve performance) after TAVI. Yet its clinical role has not been studied prospectively yet.
- We sought to assess the added value in clinical practice.

Methods

- A multicenter observational study including 80 patients who were planned for TAVI with the Evolut R Valve.
- Simulation was performed in 42 patients and no simulation in 38. The primary endpoint was the comparison between the valve size and target depth of implantation selected by the operator based on CT *(Figure below left)* and those selected after availability of the simulation results *(Figure below right)* .
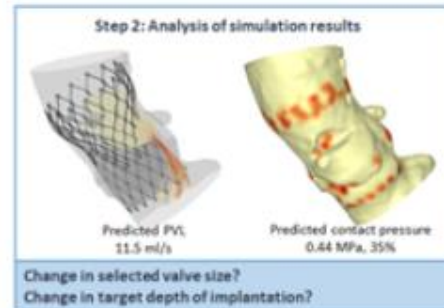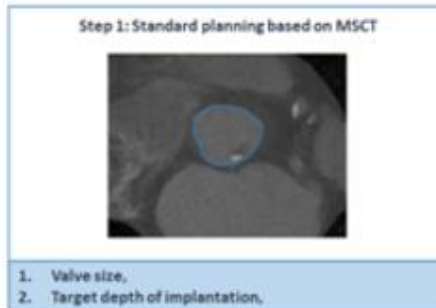
Results

Simulation in 42 patients:
1. Valve size remained unchanged in all patients (except in n=1 patient),
2. Target depth of implantation was changed in n=7 patients,
3. Simulation affected execution of TAVR in n=16 patients:
   - No additional measures to attempt target depth in n=9 patients,
   - Extra measures to reach target depth in n=7 patients,

- There was a trend for higher degree of predicted than observed aortic regurgitation after TAVI (17.5 vs 12 ml/s, p=0.13).

Conclusion

- Patient-specific computer simulation did not affect valve size selection but did affect the selection of the target depth of implantation and the execution of TAVI to achieve the desired target depth of implantation.

Step 1: Standard planning based on MSCT
1. Valve size,
2. Target depth of implantation,

Step 2: Analysis of simulation results
Predicted PVL 11.5 ml/s
Predicted contact pressure 0.44 MPa, 35%
Change in selected valve size?
Change in target depth of implantation?