Computational Modeling for the Pre-Treatment Planning of Flow Diverting Stents (ID 75)

Authors:

Introduction

Flow diverting stents (FDS) can be challenging during interventional aneurysm treatment planning. Clinicians often base their selection of stents based on the largest diameters available, irrespective of the native vessel diameter. Computational modeling has been used to predict the effects of stent deployment on vessel diameter. However, limited data exist to support the use of computational modeling to guide flow diversion planning for aneurysms.

Methods

Twenty-four patient cases in three patient groups were selected for this study (Group A: 9 cases, Group B: 12 cases, Group C: 3 cases). Cases were preoperatively imaged using an angiography system. All cases underwent in vivo imaging immediately after stent deployment. A three-dimensional computational model of the native vessel was created using medical imaging software (StrataVision, LLC). The model was used to simulate the stent deployment, and the resulting vessel diameter was compared with the native vessel diameter. The results were then compared with the preoperative imaging data to assess the accuracy of the computational modeling.

Results and Conclusions

Our study showed that computational modeling was useful in predicting the effects of stent deployment on vessel diameter. This information can be used to guide the selection of stents and the planning of interventional procedures. The results of our study also demonstrated the potential of computational modeling in improving the accuracy of treatment planning for aneurysms.

We propose a novel computational modeling approach to predict the effects of stent deployment on vessel diameter. Our approach is based on in vivo imaging and computational modeling. The results of our study showed that this approach can be used to guide the selection of stents and the planning of interventional procedures. The results of our study also demonstrated the potential of computational modeling in improving the accuracy of treatment planning for aneurysms.

Conclusion

Computational modeling for the pre-treatment planning of flow diverting stents is a promising tool in modern neurointerventional surgery. Further studies are needed to validate and optimize this approach.