pulsatile blood flow. In the systolic phase, the parent artery is exposed to high wall shear stress with the increase the flow rate through the parent artery. However, the hemodynamics inside the dilated aneurysmal region is affected by the complex interaction of blood flow and arterial wall movement. Not only the arterial wall movement but also the blood flow was highly influenced by the blood pressure closely related to the pressure boundary condition applied to the distal region of computational domain.

To obtain the effect of the pressure boundary condition for modeling the pressure drop through the distal blood vessels, the numerical results of the hemodynamics inside the fusiform aneurysm were compared with various distal vascular resistances and capacitances based on the Windkessel model. Fig. 4 shows the pressure drop through the distal blood vessels obtained from blood flow simulation without considering the arterial wall movement. From the results, it was observed that the pressure drop through the distal blood vessels linearly increases with the increase of distal vascular resistance, and the difference between systolic and diastolic blood pressure decreases with the increase of distal vascular capacitance. To match the numerical results of FSI simulation with the systolic and diastolic blood pressure of 117 and 70 mmHg, the coefficients of Windkessel model were obtained as follows:

$$
\begin{aligned}
&R = 2581.2 dyne \cdot s / cm^5, \; p_0 = 9637.5 kPa, \\
&R_d = 25166.2 dyne \cdot s / cm^5, \; C = 2.544 \times 10^{-5} cm^5 / dyne
\end{aligned}
\tag{6}
$$

From the FSI simulation using these coefficients of Windkessel model, the arterial hemodynamics inside the fusiform aneurysm was predicted as shown in Fig. 5. The numerical results of blood flow rate and blood pressure at the distal parent artery show the similar patterns compared to the velocity and pressure waveforms as shown in Fig. 2. Therefore, the distal vascular model including the distal vascular resistance and capacitance has to be considered for the realistic blood flow and blood pressure.

4. CONCLUSIONS

A fluid-structure interaction (FSI) simulation is necessary to predict arterial hemodynamics accurately, because the blood flow is related closely to movement of the arterial wall. From FSI simulations of arterial hemodynamics inside a fusiform aneurysm, it was observed that the boundary conditions related to both the blood flow and blood pressure are equally important to predict realistic arterial hemodynamics. To model the pressure drop through the distal blood vessel, both the distal vascular resistance and capacitance have to be considered.

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