Age and gender related differences in aortic blood flow

The abdominal aorta (AA) is predisposed to development of abdominal aneurysms (AAA), a focal dilatation of the artery with fatal consequences if left untreated. The blood flow patterns in the AA is thought to play an important role in the development of AAA. The purpose of this work is to investigate the blood flow patterns within a group of healthy volunteers (4 females, 7 males) aged 23 to 76 years to identify changes and differences related to age and gender. The healthy volunteers were categorized by gender (male/female) and age (below/above 35 years). Subject-specific flow and geometry data were acquired using the research interface on a medical ultrasound scanner and segmentation of 3D magnetic resonance angiography respectively. The largest average diameter was among the elderly males (19.7 (± 1.33) mm) and smallest among the young females (12.4 (± 0.605) mm). The highest peak systolic velocity was in the young female group (1.02 (± 0.336) m/s) and lowest in the elderly male group (0.836 (± 0.127) m/s). A geometrical change with age was observed as the AA becomes more bended with age. This also affects the blood flow velocity patterns, which are markedly different from young to elderly. Thus, changes in blood flow patterns in the AA related to age and gender is observed. Further investigations are needed to determine the relation between changes in blood flow patterns and AAA development.