بسم الله الرحمن الرحيم

MONA MAGHRABY

شبكة المعلومات الجامعية

التوثيق الالكتروني والميكروفيلم

MONA MAGHRABY

شبكة المعلومات الجامعية

التوثيق الإلكتروني والميكروفيلم

جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها
علي هذه الأقراص المدمجة قد أعدت دون أية تغيرات

يجب أن

تحفظ هذه الأقراص المدمجة بعيدا عن الغبار

MONA MAGHRABY

THREE-DIMENSIONAL FLUID STRUCTURE INTERACTION ANALYSIS OF ATHEROSCLEROTIC CAROTID ARTERY MODELS OF DIFFERENT CALCIFICATION PATTERNS

By

Aya Hassan Faek Abdel Hamed Mahmoud

A Thesis Submitted to the
Faculty of Engineering at Cairo University
in Partial Fulfilment of the
Requirements for the Degree of
MASTER OF SCIENCE
in
Biomedical Engineering and Systems

FACULTY OF ENGINEERING, CAIRO UNIVERSITY
GIZA, EGYPT
2020

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Title of Thesis:

Three-dimensional fluid structure interaction analysis of atherosclerotic carotid artery models with different calcification patterns.

Key Words:

Cardiovascular modelling; Fluid structure interaction; Carotid atherosclerosis; Calcified plaques.

Summary:

We presented an image-based computational modelling analysis for atherosclerotic carotid artery models with different calcification patterns. We built various carotid models based on patient specific magnetic resonance images of atherosclerotic carotid artery for a symptomatic patient. 3D Fluid structure interaction computations were performed to study the mechanical behaviour of the atherosclerotic carotid models. We investigated the stress/strain analysis of carotid plaque models that encompassed different calcification patterns. We also studied the impact of plaque morphology, stenosis degree level, material properties on the mechanical behaviour of the carotid models. Predicting the mechanical behaviour of carotid plaques leads to better patient diagnosis, and treatment as well as decreasing the high risk for endovascular procedures.

Disclaimer

I hereby declare that this thesis is my own original work and that no part of it has been submitted for a degree qualification at any other university or institute.

I further declare that I have appropriately acknowledged all sources used and have cited them in the references section.

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Signature:

Dedication

This work is dedicated to my lovely parents for their care, devotion and unconditional support, to my husband who encouraged me to pursue my research, to my sweet daughter who always inspires me and to my brother and sister for their active help.

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