Intra-abdominal pressure changes following incisional hernia repair with heavyweight versus lightweight meshes

Thesis

Submitted for partial fulfillment of M. D. degree in general surgery

By

EMAD AZIZ ELDIEN HABIB NACHLA
MBBCH
M.Sc

Under supervision of

***PROF. DR.* ABDEL-MOTY HUSSEIN**
Professor of General Surgery
Faculty of Medicine
Cairo University

***PROF. DR.* MOHAMAD ESSAM ELKOUSY**
Professor of General Surgery
Faculty of Medicine
Cairo University

***PROF. DR.* MOHAMAD AMRO ABDEL-FATAH MATAR**
Professor of Anesthesia
Faculty of Medicine
Cairo University

Faculty of Medicine
Cairo University
2012

Acknowledgement

I wish to express my sincere gratitude, deep thanks and appreciation to **Prof. Dr. Abdel-Moty Hussein,** Professor of General surgery, faculty of medicine, Cairo University for his constant encouragement, diligent advice and guidance as well as for his supervision and infinite patience in following up this work in all its stages.

A special debt of gratitude is owed to **Prof. Dr. Mohamad Essam EL-Kousy**, professor of general surgery, faculty of medicine, Cairo University whose extensive help, guidance and supervision could not be measured in acknowledgement, to whom I can not find adequate words.

I feel especially indebted and extremely grateful to **Prof. DR. Mohmad Amro Abdel-Fatah Matar,** Professor of Anesthesia, faculty of medicine, Cairo University for his continuous encouragement and helpful suggestions during the course of this work.

Finally thanks are extended to all those who participated in one way or another in making this work possible.

Abstract

This study was performed to assess and compare the effect of different types of meshes (lightweight and heavyweight) on intra abdominal pressure and ventilatory pressures. Sixty cases with incisional hernia divided into two groups (lightweight versus heavyweight) were studied in the period between March 2006 to October 2011. Intracystic pressure was measured as an indicator for intra abdominal pressure. It was concluded that there was no intraoperative or early post operative difference as regard increased intra abdominal pressure between the two groups.

Keyword: Incisional Hernia- Abdominal Compartment Syndrome - incisional hernia repair- *HWM*

List of contents

- **intraabdominal pressure**

- **Pathophysiology** 106

List of Figures

List of Table

Table of Abbreviations

Abdominal Compartment Syndrome	ACS
Abdominal Perfusion Pressure	APP
Acute Respiratory Distress Syndrome	ARDS
Central Venous Pressure	CVP
Cerebrospinal Fluid	CSF
Computerized tomography	CT
Expanded Poly-Tetra-Fluoroethylene	ePTFE
Filtration Gradient	FG
Foreign Body Reaction	FBR
Global End-Diastolic Volume	GEDV
Heavyweight Mesh	HWM
Intensive Care Unit	ICU
Interleukin-1-Receptor-Antagonist	IL-1-RA
Intra Abdominal Pressure	IAP
Intra-Abdominal Hypertension	IAH
Intra-Abdominal Pressure	IAP
Intra Cranical Pressure	ICP
Intravesical Pressure	IVP
Lactate Dehydrogenase	LDH
Lateral	L
Lightweight Mesh	LWM
Liver Function Test	LFT
Matrix MetalloProteinase	MMP
Mean Arterial Pressure	MAP
Median	M

Middleweight Mesh	MWM
Multiple Organs Dysfunction Syndrome	MODS
Newton/cm	N/ cm
Polyethylene-Terephthalat	PET
Polyglactin 910	PG 910
Polyglecaprone 25	PG 25
Polymorph Nucleocyte	PMN
Polypropylene	PP
Polyvinylidenflourid	PVDF
Positive End Expiratory Pressure	PEEP
Post Operative Day	POD
Pound per Square Inch	PSI
pound-Force per Square Inch	Ib/in^2
Pulmonary Artery Occlusion ("wedge") Pressure	PAOP
Recurrences	R
Renal Function Test	RFT
Right Ventricular End-Diastolic Volume	RVEDV
Short Form-36	SF-36
Species	spp
Standard Deviation	SD
Statistical Package for Social Sciences	SPSS
Stroke Volume Variation	SVV
Systemic Inflammation Response Syndrome	SIRS
Tension	T
Tumor Necrosis Factor	TNF
Ultrasonography	US

Versus	Vs
Width	W
World Society on Abdominal Compartment Syndrome	WSACS

Introduction

Incisional hernia is a complication in 11 - 20 % of patients after laparotomy and some of these complications requiring emergency surgery **(Conze et al., 2005).** Repair of incisional hernia is a frequent operation in surgery with recurrence rates between 14 – 50 % with traditional repair and between 0 – 10 % with mesh repair **(Welty et al., 2001).**

Despite the broad acceptance of meshes in hernia surgery, certain physical properties of mesh biomaterials can lead to undesirable consequences. These include infection, seroma formation, bowel obstruction, fistula, mesh migration, failure of repair or restriction of the abdominal wall elasticity **(Klinge et al., 1999).**

These complications have been the rationale to investigate the biocompatibility of meshes. As a consequence, two major mesh concepts are distinguished, the classic concept including so called heavyweight meshes and the new concept including lightweight meshes. Lightweight composite mesh is the result of incorporating an absorbable component into a reduced polypropylene mass (**Klosterhalfen et al., 2005).**

The normal pressure inside the abdomen is atmospheric and varies inversely with intrathoracic pressure during normal spontaneous ventilation (**Kron et al., 1984).** Intra-abdominal hypertension exists when intra-abdominal pressure exceeds a measured numeric parameter. This parameter has generally been set at between 12 and 25 mmHg. Abdominal