THE EFFECT OF INTRA OPERATIVE FLUID MANAGEMENT ON ORGAN FUNCTION AND HAEMODYNAMICS

Thesis submitted for partial fulfillment of the M.D. Degree in anesthesia

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2014

Acknowledgment

First and Foremost thanks to ALLAH, the most merciful

I wish to express my deep appreciation and sincere gratitude to ***Prof. Dr. Mai Wedad Abdallah,*** *Professor of Anesthesia, Faculty of Medicine, Cairo University, for planning and supervision of this study, valuable instructions and continuous help.*

My deepest gratitude to ***Prof. Dr. Inas Mohamed Samir,*** *Professor of Anesthesia Faculty of Medicine, Cairo University, who generously supervised my work in a supportive and educational way.*

I would like to express my deep gratitude to ***Dr. Norhan Abdulaleem Aly,*** *Lecturer of Anesthesia, Faculty of Medicine, Cairo University, for his sincere guidance and valuable instructions throughout this work.*

Dedication

I dedicate this work to my great parents

who encourged me with love

To my dear; Hana, Youssef and Hazem

Abstract

Prolonged pneumoperitomeum in LRC leads to impairement in haemodynamics and organ perfusion. Optimizing cardiac preload by fluid replacement is required.

Methods: 80 patients (ASA II, III) were divided into 2 equal groups. **Group I**: received 2ml/kg/hr LR, group II received 8ml/kg/hrLR, both groups receive 8m/kg as preload.

Results: No statistical significant difference was found in HR and MAP while there was statistical significant difference in CVP, AST, urea, creatinine and urineoutput.

Conclusion: 8ml/kg/hr maintained haemodynamic stability and organ perfusion.

Key words:

1. Pneumoperitomeum
2. Fluid replacement therapy
3. Liver function tests
4. Kidney functions tests
5. haemodynamics
6. Radical Cystectomy

Table of Contents

List Of Abbreviations

ADH:	Anti diuretic hormone
ASA:	American society of Anesthesiology
ABG:	Arterial blood gases
AST:	Alanine transaminase
ALT:	Aspartate transaminase
BCG:	Bacillus Calmette Gurein
BMI:	Body mass index
CO:	Cardiac output
CO_2:	Carbon dioxide
CIS:	Carcinoma in situ
CBC:	Complete Blood Count
Cl:	chloride
COP:	Colloid osmotic pressure
CVE:	Compensatory intravascular volume expansion
Cr Cl:	Creatinine clearance
CVP:	Central venous pressure
EELV:	End expiratory lung volume
$EtCo_2$:	End tidal carbon dioxide
ECV:	Extra cellular volume
ESL:	Endothelial surface layer
ECG:	Electrocardiogram
ECF:	Extra cellular fluid
GFR:	Glomerular filteration rate
GDT:	Goal Directed Therapy
HES:	Hydroxy ethy starch

Hr:	hour
HR:	Heart rate
IAB:	Intra abdominal pressure
ICV:	Intra cellular volume
IBW:	Ideal body weight
ICU:	Intensive care unit
KDa:	kilodalton
Kg:	kilogram
K:	Potassium
LC:	Laparoscopic cholecystectomy
LR:	Lactated ringer
LRC:	Laparoscopic radical cystectomy
LAG:	Laparoscopic gastrectomy
MAP:	Mean arterial pressure
ml:	Millilitre
MV:	Mechanical ventilation
NANC:	Nor adrenergic nor chlenergic
Na	Sodium
OG:	Op en gastrectomy
PONV:	Post operative nausea and vomiting
PP:	Pneumoperitoneal Pressure
PIP:	Peak inspiratory pressure
PEEP:	Postive end expiratory pressure
PVR:	Pulmonary vascular resistance
Po_4:	Phosphate
PRBCs:	Packed red blood cells

RBF:	**Renal blood flow**
RALRP:	**Robotic assisted laparoscopic radical prostatectomy**
SCC:	**Squameous cell carcinoma**
Spo_2:	**Pulse oximetry**
SVC:	**Systemic vascular resistance**
TCC:	**Transitional cell carcinoma**
TNM:	**T umor Node Metastasis**
TURBT:	**Transureteral resection of bladder tumor**
TBW:	**Total body water**
UK:	**United kingdom**

List Of Tables

List Of Figures

INTRODUCTION

Bladder cancer continues to be the most common cancer among men in Egypt. It represents about 30,000 new cases annually. Egypt has the highest mortality rate; it is about 16.3% 100,000 as twice as in Europe and four times as that in the United States [(1)].

The criterion standard for treatment of patients with bladder cancer is radical cystectomy with bilateral pelvic lymphadenectomy[(2)].

Urologic laparoscopic surgery progresses to pioneer new surgical approaches for treatment of diseases previously performed by an open surgery [(3)].

The advantages of using laparoscopic approach to perform radical cystectomy are decreased intraoperative blood loss, improved postoperative pain control and shorten hospital stay [(3)].

On the other hand, the disadvantages include increased technical difficulty, longer operative time and unproved long-term oncological outcomes when compared with open procedure. Future studies need to look at the immunological changes and the effect of the pneumoperitonium on the biology of cancer cells [(4,5)].

In addition to all the known complications of laparoscopy, urologic laparoscope has two unique problems. First, the urogenital system is retroperitoneal, so the large retroperitoneal space with its communications with the thorax and subcutaneous tissue are exposed to the insufflated carbon dioxide. Second, the procedures are lengthy allowing more absorption of carbon dioxide with development of acidosis and academia [6].

Normally the intra-abdominal pressure (IAP) is less than 5 mmHg. Intra-abdominal insufflation of more than 10 mmHg can cause cardiovascular, haemodynamics, respiratory and organ perfusion disturbances. Also positioning of patients in the trendlenberg position aggravates these effects [7].

Peritoneal insufflations >10 mmHg induces alterations in haemodynamics characterized by decrease in cardiac output (CO), increased arterial pressure and elevation of systemic and pulmonary vascular resistances. The decrease in CO is proportional to the increase in IAB. Most studies have shown a fall in CO by 10%-30% as detected by esophageal Doppler and transesophegeal echocardiography. Cardiac irregularities occur most common during early insufflations when pathophysiologic haemodynamic changes are most intense. Arrhythmias have many several contributing factors as increased carbon dioxide (CO_2) and gas embolism .It may present with bradyarrhythmias, tachyarrhythmias, and even asystole. These events are easily reversible [8].

Also, increased intra-abdominal pressure causes reduction in the portal venous pressure leading to hepatic hypoperfusion and acute hepatocyte injury. Portal hypoperfusion can lead to transient elevation of liver enzymes [9].

Pneumoperitonium has a direct effect on the kidneys. It decreases the cortical blood flow, induces release of certain hormones as antidiuretic hormone (ADH), plasma rennin activity, and serum aldosterone. It was demonstrated that urine output decreased significantly with insufflations and improved upon desufflation [(10,11)].

Optimizing preload fluid adminsteration has showed decreasing incidence of haemodynamic changes and postoperative nausea and vomiting (PONV) [(8)].

A recent study concluded that in patients undergoing laparoscopic bariatric surgery, intra-operative urine output is low although the use of conventional fluid therapy. The study also concluded that oliguria is not a reflection of renal dysfunction as serum creatinine was in normal range. The study also suggested that further studies are needed to evaluate these conclusions in other surgical patient population [(12)].

In our study, our patients were candidate for laparoscopic radical cystectomy. They were randomized into two groups. Group I: Controlled group will receive 2ml/kg/hr lactated ringer. Group II will receive 8ml/kg/hr lactated ringer, to assess the effect of different fluid volume on reversing the prolonged pneumoperitoneum effect on haemodynamics, liver and kidney functions.