Systemic Complications of Urologic Surgery, Pathophysiology, Prevention, and Management

Essay

Submitted for partial fulfillment of the master degree in Urology

Ву Ali Abdel-Aziz Ali мв всь

Under supervision of

Prof.Dr.Tarek Osman Al Sayed

Professor of urology Faculty of Medicine, ain Shams University

Dr. Ashraf Yahya Khedr

Lecturer of Urology Faculty of Medicine Ain Shams University

Faculty of Medicine Ain Shams University

ĺ

Contents

Subject	Page
List of Abbreviations	
List of Tables	VI
List of Figures	
Introduction	2
Aim of the work	5
Chapter 1: Cardiovascular Complications	0
Chapter ^Y : Deep vein thrombosis and pulmonary embolism	40
Chapter ": Systemic complications related to urinary diversion	٦٣ 🛛
Chapter [£] : TUR syndrome and related metabolic complications	۷٥
Chapter °: Infectious complications of urologic surgery	1.1
Chapter ¹ : Respiratory complications	125
Chapter ^V : Nutritional considerations in urologic surgery	1 2 9
Chapter A: Post operative compilations in obese patients	18.
Chapter ⁹ : Gastrointestinal complications	١٨٩
Chapter 1 • : Neurological complications	412
Chapter 11: Blood transfusion, hypothemia and bleeding disorder	222
Chapter 17: common drugs related complications	407
Summary and Conclusion	228
References	202
Arabic Summary	

-5-



د

List of Abbreviations

°AR	Og reductore
-	°α-reductase
ABCs	airway, breathing, and circulation
ACC/AHA	American College of Cardiology/American Heart Association
ACE	angiotensin converting enzyme
ACS	abdominal compartment syndrome
ACTH	adrenocorticotrophic hormone
ACP	American College of Physicians
ADH	anti- diuretic hormone
AF	atrial fibrillation
AHF	acute heart failure
AIDS	acquired immunodeficiency syndrome
APC	activated protein C
APTT	activated partial thromboplastin time
ARDS	acute respiratory distress syndrome
AS	aortic stenosis
ASA	American Society of Anesthesiologists
AT-III	antithrombin-III
ATP	adenosine triphosphate
AUA	American Urological Association
AV block	atrioventricular block
B- blocker	beta-blocker
BCG	Bacille Calmette-Guérin
BCR	biochemical recurrence
BiPAP	biphasic positive airway pressure
BiPAP	bi-level positive airway pressure
BMI	body mass index
BO	Bowel obstruction
BPH	benign prostatic hyperplasia
BPH	benign prostatic hyperplasia
BTX-A	Botulinum toxin A
BUN	blood urea nitrogen
BUN	blood urea nitrogen.
CABG	Coronary Artery Bypass Graft Surgery
CAD	coronary artery disease
CASS	coronary artery surgery study
CD	clone of differentiation
CHD	coronary heart disease
CHF	congestive heart failure
CID	Centre of Infectious Disease
CIS	carcinoma in citu

-I-

CMV	Cytomegalovirus
CNS	central nervous system
COPD	chronic obstructive pulmonary disease
CPAP	continuous positive airway pressure
CRP	C-reactive protein
CT	computerized tomography
CTZ	
CVC	chemoreceptor trigger zone Centeral venous catheter
CVC	
DES	ventral venous pressure
DES	diethylstilbestrol
	Disseminated intravascular coagulation
DRE	digital rectal examination
DVT	Deep venous thrombosis
EBRT	external beam radiotherapy
ECF	extracellular fluid
ECF	Enterocutaneous Fistula
ECG	electrocardiogram
ED	Emergence Delirium
ELISA	enzyme linked immunosorbent assay
ER	extended release
ESWL	extracorporeal shock wave lithotripsy
ETT	endoscopic transeosophageal tube
FDA	Food and Drug Administration
FDP	fibrin degradation product
FFP	fresh frozen plasma
FIO۲	fraction of inspired oxygen
GCS	graduated compression stockings
G-CSF	granulocyte colony-stimulating factor
GFR	glomerular filtration rate
GNEB	Gram-negative enterobacteriaceae
GRV	gastric residual volume
GVHD	graft-versus-host disease
HAP	hospital-acquired pneumonia
HCl	hydrochloride
HDU	High Dependency Units
HF	heart failure
HIV	Human immunodeficiency virus
HLA	Human leucocytic antigen
HMG-CoA	hydroxymethylglutaryl coenzyme A
HNA	human neutrophil alloantigens
HoLEP	Holmium laser enucleation of the prostate
HTLV	Human T cell Lymphocytic Viruses
ICD	implantable cardioverter defibrillator
ICU	intensive care unit

-II-

List of Abbreviations

IFN-γ	interferon-gamma
IΓΝ-γ Ig	immunoglobulin
IGF	insulin-like growth factor
IGF	interleukin
IL IL- [\]	interleukin
INH	isoniazide
IP IDC	inspiratory pressure
IPC	intermittent pneumatic compression
IPVP	intraprostatic vasopressin
IV UFH	intravenous unfractionated heparin
IVC	inferior vena cava
LBP	lipopolysaccharides binding protein
LDUH	low dose unfractionated heparin
LMWH	low molecular weight heparin
LPS	lipopolysaccharides
LV	left-ventricular dysfunction
dysfunction	
LVEF	left ventricular ejection fraction
LVF	left-ventricular function
MAC	Minimum Alveolar Concentration
MAP	mean arterial pressure
Mbp	mean blood pressure
MCV	mean corpuscular volume
MI	myocardial infarction.
MIF	macrophage inhibitory factor
MMC	mitomycin C
MODS	Multiple organ dysfunction syndromes
MR	mitral regurgitation
MRI	magnetic resonance imaging
MRPA	magnetic resonance pulmonary angiogram
MRSA	methicillin-resistant Staphylococcus aureus
NCCN	National Comprehensive Cancer Network
NF- κB	NF-kappa B
NG	nasogastric
NM	neuromuscular
NMDA	N-methyl-D-aspartic acid
NO	nitric oxide
NSAIDs	non-steroidal anti-inflammatory drugs
OAB	overactive bladder
OPERA	Overactive Bladder: Performance of Extended-Release Agents
OSA	obstructive sleep apnea
OT	operative theatre

-III-

List of Abbreviations

	where whet ded is existed to bise on
PIT-K	phosphatidyl-inositol ^w -kinase
PACU	postoperative anaesethia care unit
PAF	platelet-activating factor
PAMP	pathogen associated molecular patterns
PaOY	partial pressure of oxygen
PC	prostate cancer
Palv	Alveolar pressure
Ppl	Pleural pressure
PCI	Percutaneous Coronary Intervention
PCNL	percutaneous nephrolithotomy
PE	pulmonary embolism
PEEP	positive end expiratory pressure
PGE	prostaglandin E
PH	Perioperative Hypothermia
PN	Parenteral nutrition
POI	postoperative ileus
PPB	permanent prostate brachytherapy
PPCs	Post-operative pulmonary Complications
PPMs	permanent pacemakers
PRR	pattern recognition receptors
PSA	prostate-specific antigen
PSVT	paroxysmal supraventricular tachycardia,
РТ	prothrombin time
PTE	pulmonary thromboembolism
PVR	pulmonary vascular resistance
RAS	renin–angiotensin system
RBCs	red blood clls
RCC	renal cell carcinoma
RCRI	revised cardiac risk index
RFC	residual function capacity
RP	radical prostatectomy
RRP	radical retropubic prostatectomy
RV	right ventricular
RVF	right ventricular failure
SBO	small bowel obstruction
sc	Subcutaneous
SIRS	
	Subcutaneous systemic inflammatory response syndrome

-IV-

SLE	systemic lupus erythematosis
SSIs	surgical site infections
T pallidum	treponema pallidum
TED	Transesophageal Doppler
TEE	transeosophageal echocardiogram
aTHR	antithrombin
TLR	toll-like receptors
TNF	tumor necrosis factor
INF	
TPP	Transpulmonary pressure
TNF-α	tumour necrosis factor α
TPN	Total Parenteral nutrition
TPP	monary pressure
TRALI	Transfusion-related acute lung injury
TRUS	transrectal ultrasonography
TUR	Transurethral resection
TURBT	Transurethral Resection of Bladder Tumor
TURP	transurethral resection of the prostate
UTI	urinary tract infection
UV	ultraviolet
VA/Q	ventilation/ perfusion ratio
VAC	vacuum-assisted closure
VAP	Ventilator -associated pneumonia
VC	venous capacitance
VES	ventricular extrasystole,
VR	venous return
VRE	vancomycin-resistant enterococci
VT	ventricular tachycardia
VTE	Venous thromboembolism
VUR	vesicoureteric reflux
VUS	vesicouretheral stricture
vWF	von Willebrand's factor

List of Tables

No	Table	page
1-1	Cardiac RiskStratification for Surgical Procedures	٩
۲_۱	Classes of Clinical Predictors of Cardiovascular Risk	۱.
۳_۱	Active Cardiac Conditions for Which the Patient Should))
	Undergo Evaluation and Treatment before Surgery	
۱_٤	Lists the molecular targets of anti-arrhythmic agents used peri-operatively	١٩
۲_۱	Electrocardiographic findings in pulmonary embolism	٤٧
۲_۲	Echo-cardiographic findings in pulmonary embolism	٤٨
۳_۲	Diagnostic Imaging Tests	٤٩
۲_٤	Food and Drug Administration approved thrombolytic regimens for pulmonary embolism	05
٥_٢	Patient Risk Stratification	٥٧
۲_٦	Current Guidelines for VTE Prophylaxis in Surgical	٥٩
	Patients	
۲_۷	Sites and Magnitude of the Antithrombotic Action of Unfractionated Heparin	٦.
۳_۱	Metabolic Abnormalities of Urinary Diversion	70
£_1	Risk factors for TUR syndrome.	<u>۸۱</u>
٤_٢	Signs and symptoms associated with acute hyponatremia	٨٢
٤_٣	Osmolality of various irrigation solutions used for	٨٩
	transurethral prostatectomy	
£_£	Signs and symptoms of transurethral prostatectomy syndrome	٩١
٤_0	Management of Acute (< [£] ^A Hours) or Symptomatic Hyponatremia.	۱۰۰
0_1	Definition of the systemic inflammatory response syndrome.	۱.۳
٥_٢	Organ Dysfunction Criteria	١.٧
۳_٥	Classification of sepsis stages and lethality	١٠٦
0_£	Clinical stages of urosepsis	117
0_0	Laboratory findings in urosepsis	117
٥_٦	Commonly used parenteral antibiotics for empiric therapy	17.
	of urosepsis	
۲_۱	showing risk factors for pulmonary complications.	13.
۲_۲	Antimicrobial treatment of nosocomial pneumonia.	127

-VI-

List of Tables

۷_۱	Selected Complications Associated with Enteral Nutrition.	101
۷_۲	Complications Associated with P N	170
۸_۱	Classification of body mass index (BMI) proposed	171
	WHO expert committee and risk of comorbidity.	
۹_۱	Predicting the likelihood of spontaneous enterocutaneous	۲۱.
	fistula closure.	
11-1	Perioperative management to avoid blood transfusion.	252
11_7	Signs and symptoms of hypothermia.	7 2 7
11_7	Laboratory Findings and Treatment of Factor Deficiencies.	705
12-1	Relative Risk of Emesis for Commonly Administered	707
	agents in genitourinary malignancies.	
12-2	Risk of Neutropenia for Commonly Administered agents	209
	in Genitourinary malignancies.	

-VII-

	<u> </u>	
No	Figure	Page
1-1	Peri-operative therapy with Beta –blockers.	١٧
۲_۲	Pathway for anti-arrhythmic therapy.	۲.
۲_۳	chart for immediate goals in treatment of the patients with acute heart failure.	70
۲_۱	Factors of Virchow's triad-venous stasis, hypercoagulability, and changes in the blood vessel wall endothlium , contribute to DVT.	٣٩
۲_۲	The coagulation system, often described as a "cascade", consists of a group of proteins that interact to form a blood clot.	٣٩
۳_۲	Pathophysiology of pulmonary embolism	٤.
۲_٤	The beginning of venous thrombosis is caused by tissue factor, which leads to conversion of prothrombin to thrombin, followed by fibrin deposition.	٤ •
۲_0	Plasma D-dimer is generated exclusively from plasmin breakdown of fibrin clot.	٤٧
۲_٦	Pulmonary infarct. Frontal chest radiograph reveals wedge- shaped area of air-space disease in left costophrenic sulcus	٥.
۲_۷	Acute pulmonary embolism. Perfusion scan reveals multiple wedge-shaped perfusion defects (arrows).	01
۲_۸	Ultrasonography of the leg veins (Duplex) Showing Vein within thrombous.	0.
۲_٩	Acute pulmonary embolism. Selective digital subtraction angiography in left pulmonary artery reveals segmental branch filling defect (arrow) diagnostic of PE.	01
۲_۱۰	Computed tomography Westermark sign. Thin-slab axial minimum intensity projection image reveals wedge-shaped region of hypoperfusion (large arrowheads) relative to normal parenchyma due to central pulmonary embolism	07
7-11	Integrated diagnostic algorithm for suspected VTE	07
7_17	Photograph of a retrievable inferior vena cava filter	00
۲-۱۳	A venogram demonstrating a retrievable filter laden with clot from a trapped lower extremity embolus	07
7-12	Mechanism of action of heparin	٦٠
۳-۱	Principles of Fluid and Electrolyte Absorption	٦٩

List of Figures

-VIII-

٤_١	The handling and toxic effects of glycine	٨٩
٤_٢	Representative transesophageal Doppler (TED) traces of the	٩٤
	descending aorta during baseline conditions before (A) and	
	during transurethral resection of the prostate syndrome (B).	
٤_٣	Photography of the transesophageal Doppler (TED) probe	90
	used in the presented case	
٤_٤	Transrectal ultrasound before and after Green Light HPS	٩٨
	treatment showing removal of the enlarged transitions zone	
	of the prostate.	
٥_١	Cardiovascular changes associated with septic shock.	1.2
۲_0	Heidelberg sepsis pathway	171
0_7	Protocol for early goal directed therapy for sepsis.	177
0_£	Effects of the different adrenergic agents on cardiac output	171
	and arterial pressure.	١٢٩
۲_۱	A schematic representation of the pathophsiological	114
	mechanisms leading to post-operative pulmonary	
۲_۲	complications.	١٣٢
·- ·	Factors producing respiratory muscle dysfunction after surgical trauma.	,,,,
۲_۳	(A and B) In normal lungs (A), the alveolar inflation and	185
	vascular perfusion are associated with low stress and are not	
	injurious	
۲_٤	This schematic outlines the probable pathogenic mechanisms	180
	underlying the development of atelectasis	
٥_٢	Examples of CT scans of a patient with healthy lungs, before	١٣٦
	and after induction of anaesthesia.	
۲_۲	Chest radiograph demonstrating a new pulmonary infiltrate	155
	involving the right lower and upper lobes.	
۲_۷	Chest radiograph and computed tomography scan of thorax	١٤٨
	show a right-sided effusion	
٧-١	Overnutrition and undernutrition lead to inflammatory	101
N4 11	activity.	
۲_۲	Vicious circle of the development and progression of	107
	disease-related malnutrition.	• • •
۷_۳	Percutaneous Endoscopic Gastrostomy	105
٨_١	Factors influencing the development of obesity	171

List of Figures

-IX-

۸_۲	Summary of the possible mechanisms why obese patients are at higher risk to develop biochemical recurrence	182
۹_۱	Probable SBO pattern.	۲۰۱
۹_۲	Upright abdominal radiograph of patient in B.	۲_۲
٩_٣	Simple complete small bowel obstruction caused by adhesions.	۲.۲
۹_٤	Ultrasonogram of simple small bowel obstruction	۹.٣
۹_٥	Fistulogram showing a colocutaneous fistula following anastomotic leak after colostomy closure.	۲.٦
٩_٦	Intubation of fistulous tract with drain.	۲.۸
۹_۷	Zinc oxide cream barrier around enterocutaneous fistula, with the fistula opening seen.	۲.٩
۹_۸	CT scans showing the adherence of the sigmoid colon to the lateral edge of the bladder.	717
٩_٩	the fistula appears as a raised, edematous, sessile lesion in the bladder.	215
٩_١٠	Cystoscopy view of an anastomotic urethrorectal fistula that developed after radical prostatectomy.	215
۱۰-۱	Common mechanism of femoral nerve injury by retractor placement.	۲۳.
11-1	shows Perioperative management to avoid Perioperative hypothermia.	۲٤٨
11_7	Forced air warming blanket	259
11_7	Intravenous fluid warmer.	7 2 9

List of Figures

-X-

المضاعفات العامة لجراحة المسالك البولية الفسيولوجية المرضية والوقاية و التشخيص والعلاج

رسالة مقدمة توطئة للحصول على درجة الماجستير في جراحة المسالك البولية

من الطبيب/ على عبد العزيز على

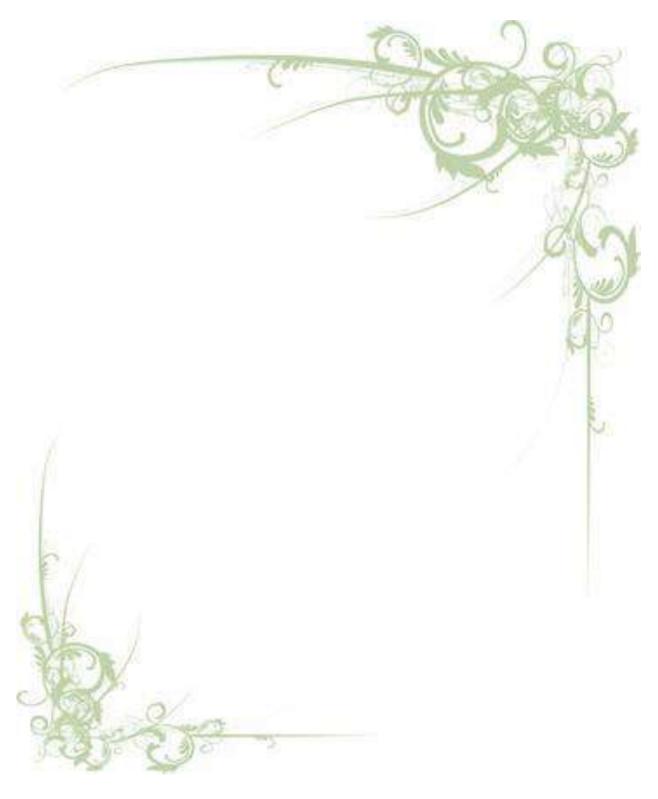
تحت إشراف

أ.د./ طارق عثمان السيد

أستاذ جراحة المسالك البولية كلية الطب . جامعة عين شمس

د. / أشرف يحيي خضر





-0-