كليـــــــة الطب
والصيدلة - مراكش
FACULTÉ DE MÉDECINE
ET DE PHARMACIE - MARRAKECH

MARRAKECH
جامعة القاضي عياض
UNIVERSITÉ CADI AYYAD

Year 2023 Thesis N°141

Management of Frequent Visceral Surgical Emergencies in Pediatrics: A Student's Guide

THESIS

PRESENTED AND PUBLICLY DEFENDED ON 30/03/2023

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Born on April 30th 1997 at Safi

FOR OBTAINING A DOCTORATE IN MEDICINE

KEYWORDS:

Student's Guide – Surgical Emergency – Pediatrics – Diagnosis – Management – Emergency Room

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إِنَّ مَعِيَ رَبِّي سَيَهْدِينِ
My Lord is with me, Soon will He guide me.

Hippocratic Oath

Upon being admitted to the medical profession, I pledge my life to the service of humanity.

I will treat my teachers with the respect and gratitude they deserve. I will practice my profession with conscience and dignity. The health of my patients will be my first goal. I will not betray the secrets entrusted to me.

I will maintain by all means in my power the honor and noble traditions of the medical profession. The physicians will be my brothers.

No consideration of religion, nationality, race, political and social considerations will come between my duty and my patient. I will maintain strict respect for human life from the moment of conception. Even under threat, I will not use my medical knowledge in a manner contrary to the laws of humanity. I pledge this freely and on my honor.

Declaration of Geneva, 1948.

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LISTE ARRÉTÉÉ LE 26/09/2022

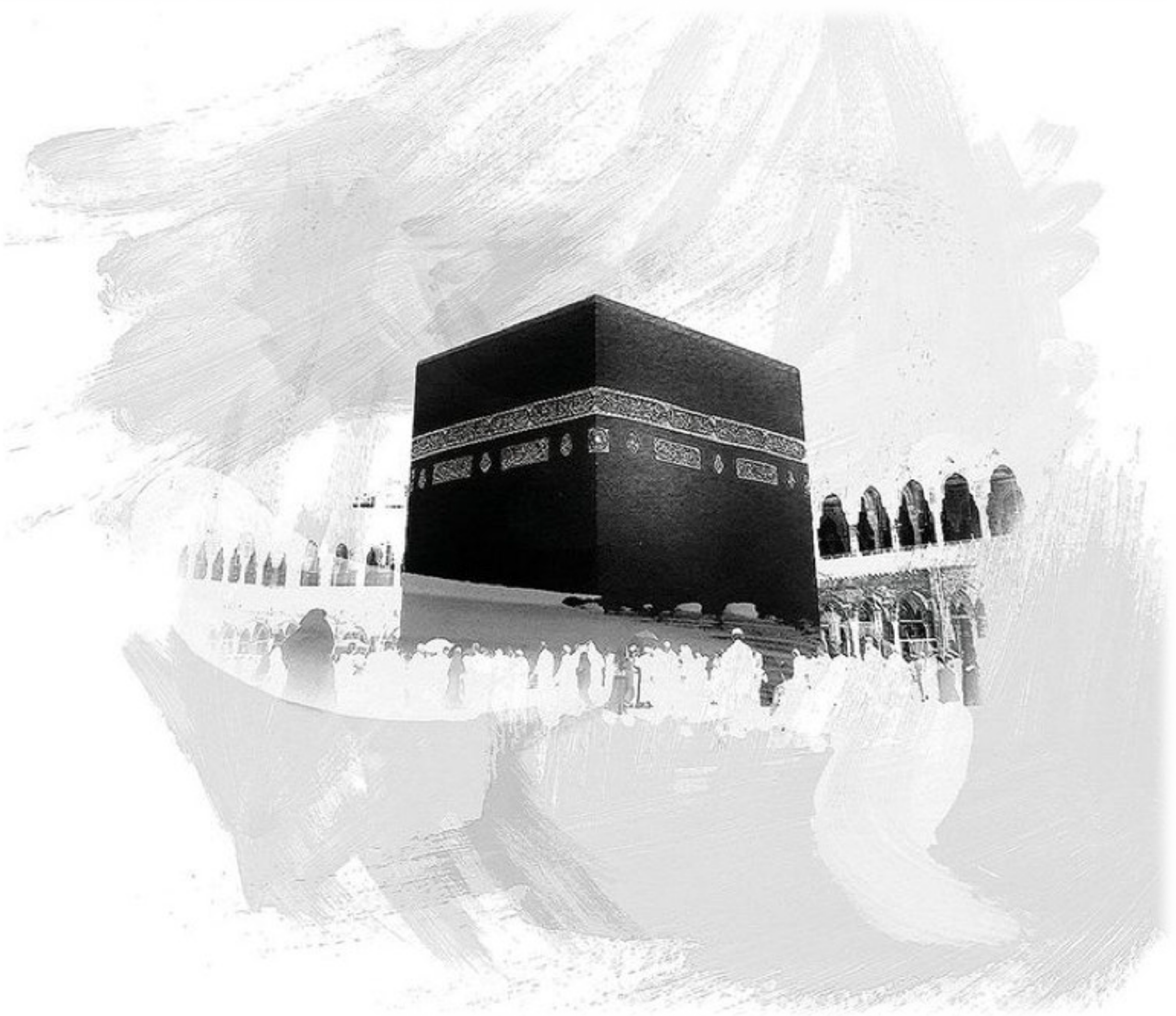
DEDICATIONS

It is with immense pleasure and great honor

that I dedicate this work to:

"And great is the Grace of Allah unto thee."

– 113 An-nNisa'



This thesis is wholeheartedly dedicated to my Creator, The Guarantor, The Ever Providing, The Supreme Bestower, The Forbearing, the Indulgent, The Bountiful, the Generous, The All Rich, The Pardoner, The Most Merciful, The Subtly Kind, The All Aware, The All Knowing, The Omniscient.

"O satisfied soul, return to your Lord wellpleased, wellpleasing. Join My worships and enter My Paradise!" – 89 Al-Fajr

To my spiritual father, my mentor and guide, Late ***Imam Abdessalam Yassine*** *may God have mercy on him, to his late wife* ***madam Khadija Elmalki*** *may God have mercy on them both. For navigating me through this ongoing journey of seeking the truth, for providing new answers to the hardest questions to exist, and for teaching me that the real success, the ultimate success, is the success in this life and the next.*

For these reasons and more, I wholeheartedly dedicate this thesis to them and to all their spiritual sons and daughters.

"And say: My Lord, bestow on them thy Mercy even as they cherished me in childhood." – 24 Al Isra

To my loving parents, ***Zahra Errihani*** *and* ***Mohammed Qanoune****, for their unconditional love and devotion, for their never-ending sacrifices and their unparalleled dedication and utmost devotion to my sisters and I's education, for all of their prayers that have carpeted the floors ahead of us.*

May God protect you, grant you good health and long pious lives, so that together we may enjoy the fruits of this work that is yours, written by your own blood, sweat and tears.

May this work forever be a witness of your good parenting and your good manners. And may you always be pleased with my sisters and I. This thesis is yours, and so am I.

"We will certainly strengthen thy arm through thy brother"

– 38 Al Qasas

*To my sisters, **Samiya** and **Nissrine**, for being my role models, for always making me better, for growing together and maturing together. Indeed, we do not get to choose our siblings, yet I would've chosen you.*

No tribute can convey the love, devotion and respect I have for you. No dedication could be eloquent enough to express what you deserve for accompanying me through every step of my life and being my bestfriends. For my inability to express the gratitude I have towards you, I dedicate this thesis to you.

*To my dear grandparents **Boujemaa Errihani, Mahjouba El Asri, Ahmed Qanoune** and the kindest of all **Zineb Bachra**.*

Your special love has always submerged my life. Thank you for your sincere prayers that helped me through life. I pray God to grant you the highest ranks of Paradise.

*To my dear aunt **Amina Errihani**, your unwavering support and motivation throughout this journey were priceless.*

Please find in this modest work the expression of my deep affection and my sincere gratitude. May God grant you health, peace of mind, and happiness in this life and the next.

To my childhood friends ***Abdollah Abdala, Mariam Abdala, Soumaya Bara, Oussama Bara, Salma Jerouane, Mohammed Amine Jerouane, Assia Akhbi, Ayoub Errihani, Abdessamad Errihani, Nabil Errihani, Yassine Errihani*** *and all of my cousins, thank you for making my childhood remarkable and jolly. May our ties always remain strong and may God bring us happiness and help us fulfill all of our wishes. I love you all and dedicate this thesis to you.*

To all members of my loving ***Errihani*** *and* ***Qanoune family****. I would have liked to be able to mention each one by name. Thank you for your encouragement and support throughout the years. In recognition of the great affection you have shown me and for the gratitude and sincere love I have for you. I dedicate this thesis to you.*

To my bestfriend and truthful companion on this eventful yet beautiful journey of medical studies, my dearest ***Ibtissam Quiouch*** *and to all the members of the* ***Quiouch family*** *for being my second family, a family of heart, for always being so welcoming and kind, for all these years together, and for many years to come, I dedicate this thesis to you.*

To my dearest friend and favorite nightshift partner ***Khaoula Outaghyame****, for all the moments we've spent together, their ups and downs, for all the moments to come, for your pure heart and your unconditional love for others, for your unmatched courage and your remarkably good manners, for all of this and more, I dedicate this thesis to you.*

To my sisters of heart, ***Fatima-ezzahraa El Idrissi, Fatima Hamma, Meriem Najah, Sara Hamma, Khaoula El Harchi, Asmaa Fathi, Bouchra Bouyeknifen, Salma El Warraki, Asmaa Lamhaden, Imane Lkhassil, Assiya Tiji, Fatimaezzahraa Bejjou, Aziza Zozo, Hajar Elmaski, Hajar Ennaimi, Douaa Irrou, Hajar Anouar, Israa Zardakhane, Chaimaa Elaiche, Nouha Hachimi*** *and to the ones I forgot to mention.*

It is with unconditional love and deep care that I offer you this modest work. I wish you from the bottom of my heart futures full of happiness, piety and success. May God bless and protect you all and guide your steps and may our union be eternal.

To the young women I look up to, to Mrs. ***Hanane Bouhssini,*** *Mrs.* ***Khadija Hajaoui*** *and Ms.* ***Fatiha Aitlqadi.*** *For broadening my horizon and strongly yet very gently and beautifully representing what a young muslim woman is truly like.*

Thank you for being my rolemodels. I pray God to accompany you through life and grant you the highest ranks of Paradise and forever be pleased with you.

To my mentors Sir ***Mohammed Kettani****, Sir* ***Youssef Qaq****, Sir* ***Omar Aitlaqtib****, Sir* ***Mounir Jouri****, Sir* ***Hicham Chouladi****, Sir* ***Abdellatif Zardakhane****, Sir* ***Mohammed Ighadioune****, Sir* ***Mohammed Azmi*** *and Sir* ***Boubker Elouankhari*** *for your guidance, your devotion and everything you represent. Please find in this modest work the expression of my deep affection and my sincere gratitude.*

To all of my friends at the ***MedMore club****, for offering a refuge to many students searching to fulfill their full potential of being medical students and more. For being an examplary club and perfectly representing what a passionate, dedicated and caring medical student is, inside the campus and out. For everything you've contributed to the Faculty of Medicine and Pharmacy of Marrakech and to our society.*

For allowing me to be a member of this beautiful family, and a part of this marvelous journey. Our journey together has not come to an end. And I dedicate this thesis to you.

To all my teachers who have passed on their knowledge to me, from kindergarten until today. To all of my people that I have mentioned and the ones that I unintentionally forgot to mention.

And to all those who, in one way or another, contributed to my education and well-being. Please find in this work the expression of my endless gratitude.

ACKNOWLEDGEMENTS

To my professor and supervisor Mr. Mohamed Oulad Saiad, *for teaching me medical English on my first year of medical studies, for always representing how an exemplary devoted doctor and professor should be towards his patients and students, and for giving me the fortunate opportunity to work under your supervision and allowing me to pursue this work with so much devotion and liberty.*

You have granted me a great honour and privilege by accepting to direct my work.

I thank you infinitely, dear Master, for having devoted to this work a part of your precious time and for having guided me with rigour and benevolence. I am very proud to have learned from you and I hope I have lived up to your expectations.

Please accept, dear master, in this work the assurance of my esteem and my deep respect

To professor and president of my thesis Mr. Mounir Bourrous, *I am very grateful for the honour you have done me by agreeing to chair the jury for this thesis. I have had the great privilege of benefiting from your brilliant teaching during my years of study.*

Please accept, dear Professor, the testimony of my deepest gratitude for the great honour you have done me by chairing my thesis.

To professor Kamili El Ouafi El Aouni, *You have done me the honour of accepting to be a member of this honourable jury and I thank you for the trust you have placed in me.*

You have always given me the warmest welcome despite your professional obligations.

Please accept, dear Master, the assurance of my respect and my great gratitude.

To professor Youssef Mouaffak, *You have done me the honour of accepting to be a member of this honourable jury and I thank you for the trust you have placed in me.*

You have always given me the warmest welcome despite your professional obligations.

Please accept, dear Master, the assurance of my respect and my great gratitude.

To professor Hicham Jalal, *You have done me the honour of accepting to be a member of this honourable jury and I thank you for the trust you have placed in me.*

You have always given me the warmest welcome despite your professional obligations.

Please accept, dear Master, the assurance of my respect and my great gratitude.

LIST OF ABBREVIATIONS

List of Abbreviations :

EA:	Esophageal Atresia
TEF:	Tracheoesophageal Fistula
NG:	Nasogastric
US:	Ultrasound
MR:	Magnetic Resonance
MRI:	Magnetic Resonance Imaging
CT:	Computed Tomography
NPO:	Nil Per Os
NICU:	Neonatal Intensive Care Unit
GER:	Gastro-Esophageal Reflux
CDH:	Congenital Diaphragmatic Hernia
LHR:	Lung-to-Head Ratio
CPAMs:	Congenital Pulmonary Airway Malformations
HFOV:	High Frequency Oscillatory Ventilation
ECMO:	Extra-Corporeal Membrane Oxygenation
CXR:	Chest X-Ray
NIO:	Neonatal Intestinal Obstruction
MI:	Meconial Ileus
AFLs:	Air-Fluid Levels
UGI:	Upper Gasto-Intestinal
GI:	Gastro-Intestinal
AXR:	Abdominal X-Ray
BMI:	Body Mass Index

AFP: Alpha-Feto-Protein

IUGR: Intra-Uterine Growth Retardation

IV: Intravenous

IAP: Intra-Abdominal Pressure

BW: Beckwith-Wiedemann

BHCG: Beta Human Chorionic Gonadotrophin

CBPMs: Congenital Broncho-Pulmonary Malformations

CLE: Congenital Lobar Emphysema

BPS: Broncho-Pulmonary Sequestration

CVR: Cystic pulmonary airway malformation Volume Ratio

CCAM: Congenital Cystic Adenomatoid Malformation

CLO: Congenital Lobar Over-inflation

eBPS: extra-lobar Broncho-Pulmonary Sequestration

iBPS: intra-lobar Broncho-Pulmonary Sequestration

ARMs: Ano-Rectal Malformations

PSARP: Posterior Sagittal Ano-Recto-Plasty

HPS: Hypertrophic Pyloric Stenosis

II: Intestinal Intussusception

PLP: Pathologic Lead Point

RUQ: Right Upper Quadrant

RLQ: Right Lower Quadrant

DRE: Digital Rectal Examination

AA: Acute Appendicitis

RIF: Right Iliac Fossa

LIF:	Left Iliac Fossa
FBC:	Full Blood Count
CBC:	Complete Blood Count
WBC:	White Blood Cells
CRP:	Capsular Reactive Protein
PMN:	Poly-Morpho-Nuclear cells
PAS:	Pediatric Appendicitis Score
AIR:	Appendicitis Inflammatory Response score
NAR:	Negative Appendectomy Rate
NOM:	Non-Operative Management
SSI:	Surgical Site Infection
LOS:	Length Of Stay
MD:	Meckel's Diverticulum
OMD:	Omphalo-Mesenteric Duct
FOBT:	Fecal Occult Blood Test
RBC:	Red Blood Cell
BA:	Biliary Atresia
JSPS:	Japanese Society of Pediatric Surgeons
KPC:	Kasai Porto-Cholecystostomy
KPE:	Kasai Porto-Enterostomy
BASM:	Biliary Atresia Splenic Malformation syndrome
LFTs:	Liver Function Tests
AST:	Asparate Aminotransferase
ALT:	Alanine Aminotransferase

ALP:	Alkaline Phosphatase
GGT:	Gamma-Glutamyl Transferase
PT:	Prothrombin Time
CF:	Cystic Fibrosis
HIDA:	Hepatobiliary Imino-Diacetic Acid
ERCP:	Endoscopic Retrograde Cholangio-Pancreatography
SPMG:	Splenomegaly
WT:	Wilms' Tumor
IVC:	Inferior Vena Cava
UA:	Urine Analysis
XPN:	Xantho-granulomatous Pyelo-Nephritis
COG:	Children Oncology Group
SIOP:	Société Internationale d'Oncologie Pédiatrique
NSS :	Nephron-Sparing Surgery
CTH :	Chemotherapy
RTH :	Radiotherapy
LOH:	Loss Of Heterozygosity
IH:	Inguinal Hernia
IIH:	Incarcerated Inguinal Hernia
PV:	Processus Vaginalis
PPV:	Patent Processus Vaginalis
TT:	Testicular Torsion
TWIST:	Testicular Work-up for Ischemia and Suspected Torsion
PUV:	Posterior Urethral Valve

VUR:	Vesico-Ureteric Reflux
RBUS:	Renal and Bladder Ultrasound
VCUG:	Voiding Cystourethrogram
UPJ:	Uretero-Pelvic Junction
SPC:	Supra-Pubic Catheter
ESRD:	End-Stage Renal Disease
UTI:	Urinary Tract Infection
OT:	Ovarian Torsion
HH:	Hematocolpos and Hydrocolpos
OHVIRA:	Obstructed Hemi-Vagina with Ipsilateral Renal Anomaly
CC:	Chief Complaint
HPI:	History of Present Illness
GA:	Gestational Age
ATLS:	Advanced Trauma Life Support
ABCDE:	Airway Breathing Circulation Disability Exposure
AMPLE:	Allergies Medication Past medical history Last meal Environment
ED:	Emergency Department
GCS:	Glasgow Coma Score
FAST:	Focused Assessment with Sonography in Trauma
eFAST:	extended Focused Assessment with Sonography in Trauma
OR:	Operating Room
SWOT:	Strengths Weaknesses Opportunities Threats

SUMMARY

INTRODUCTION

Pediatric surgery is a surgical specialty defined as the diagnostic, operative, and postoperative surgical care for children with congenital and acquired anomalies and diseases, whether they are developmental, inflammatory, neoplastic or traumatic, with the scope of this discipline extending from surgical problems during the intra-uterine life, to infancy, childhood, adolescence, and sometimes, even young adulthood. [1]

Compared to other specialties that are focused on a particular technique or limited to a certain area of the body, pediatric surgery is the only surgical specialty that is defined by the patient's age rather than by a specific condition, therefore highlighting the need to meet certain requirements in coping with the wide physiological differences between each of the age groups, as well as the development of a specific set of skills and professional attitudes in covering the needs of both the patients and their families. [2]

The wide variety of conditions and age groups that this specialty covers explains the increasing interest of developpig further specialized branches dedicated to specific domains of expertise, amongst which fetal surgery is one of the most recent concepts in the field.

Meanwhile, in our Moroccan context, pediatric surgery is considered to be a distinct surgical specialty, and is divided into two main subspecialties: ***Orthopedic pediatric surgery*** and ***Visceral pediatric surgery***, with emergent visceral pediatric surgical conditions being the main focus of this thesis.

Visceral surgical emergencies in pediatrics encompass the different conditions representing an acute threat to life or function, emanating from external trauma, acute disease process, acute exacerbation of a chronic process, or complication of a surgical or other interventional procedure, interesting the abdominal cavity and abdominal wall, as well as endocrine glands and soft tissue, in the pediatric population. [3]

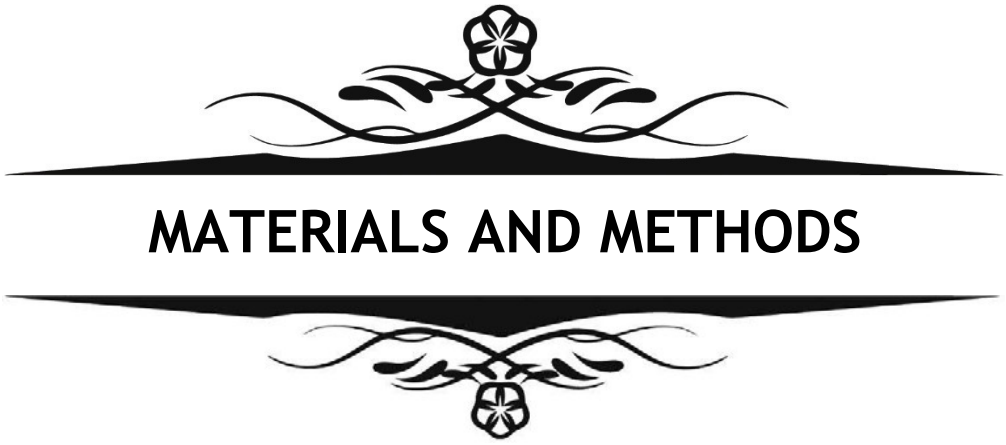
Accordingly, management of these conditions is carried out in an unanticipated

manner and requires the cooperation of all parties of the health staff to preserve the patient's life and well-being lying under direct jeopardy. An integral component of this health staff and a fundamental contributor to the overall development of the health system is the medical student, defined as every student enrolled in a medical school and training to become a doctor of medicine.

Although the nature of medical practice and the constant need to keep up with the most recent recommendations and updated guidelines makes it an on-going learning process, the particularity and uniqueness of the medical studies phase lies in the first-time introduction to adequate clinical reasoning and development of physical examination skills, as well as the remarkable opportunity to establish structured professional interactions with patients and their families and its especial benefit in the practice of specific aspects of history-taking and improving one's general communication skills, all while being mindful and understanding of the patient's perspective of illness.

With this in mind, the following student guide has been elaborated, in the context of a thesis to obtain the doctorate in medicine, with the aim of serving as a tool for medical students, assisting them in the process of management of certain frequent visceral surgical emergencies in pediatric patients, starting with the diagnosis, with a specific emphasis on the clinical aspect, in addition to the display of treatment plans and the anticipation of potential outcomes and evolution courses.

There are several excellent pediatric surgery textbooks available which focus on the historical background, embryogenesis, etiology, diagnosis and detailed operative management of childhood surgical disorders but very few are destined to medical students. Therefore, this student guide has been written in a practical, goal-oriented, yet exigent manner, specifically elaborated to respond to the needs and expectations of medical students, providing them with the most recent and accurate scientific knowledge available while putting the diagnosis aspect at the center of our attention.



MATERIALS AND METHODS

I. General considerations

A Student's Guide in the setting of medical studies, similar to other settings, is an academic tool that promotes independent learning, by offering an invaluable learner support, adjunct to the typical courses being delivered as a fundamental part of the medical school curriculum, while providing the learner with the opportunity of developing a large set of technical, research and critical thinking skills that will assist their thinking and learning methodologies throughout their medical careers.

Similarly, the following student's guide, dedicated to the management of frequent visceral surgical emergencies in pediatrics hopes to perform as a learner support and an academic resource including information on the topic that is pediatric visceral surgical emergencies and their management while responding to the following guidelines and requirements:

- To be in line with the most recent data on each subject and in accordance with the latest scientific advances, while being mindful of the local challenges that might prevail.
- To use English as a language and communicate ideas using simple sentences rather than complex ones.
- To incorporate a style of writing that is both informative and effective as well as enjoyable and user-friendly, carefully balanced in order to preserve the academic rigour while employing a rather inclusive and personal tone.
- To create a distinct visual identity of the student's guide with the aim of making it engaging and appealing to the learners.
- To be patient and respectful to the process.

"Il faut se donner beaucoup de peine pour être lu et compris sans peine".

"One should make so much effort in order to be read and understood without effort".

-Professor Moulay Driss El Amrani

II. Materials :

1. Resources:

The elaboration of the student's guide has been based on the information gathered from a variety of e-books and articles, approximately amounting for a hundred references, all cited in the bibliography chapter. Amongst which:

- 16 e-books, including:
  - 9 general pediatric surgery
  - 1 neonatal surgery
  - 1 thoracic surgery
  - 2 digestive surgery
  - 3 Pediatric emergency room
  - 1 wilms' Tumor
- 78 articles (>50% released on year 2020 or later).

This number would be significantly higher had we considered the numerous articles making up the ebooks as distinct individual articles to be cited separately depending on the treated topic.

Another valuable resource has been represented by the courses of visceral pediatric surgery being taught as a part of the fourth year of medical studies program at the faculty of medicine and pharmacy of Marrakech, also included amongst the other references.

2. Software:

During the development of the student's guide, a number of software programs have been utilized, including:

- Microsoft Word 2019
- PDF
- Adobe Photoshop
- Mendeley Reference Manager

III. Methods :

As suggested by the general guidelines of developing a student's guide, the steps to its creation include:

- *A planning stage:* involves preparing a chart of each individual pathology tracking the different articles and book citations on the topic and deciding on the general frame-work of the pathology in question. (Find the chart listed as **Appendix1**)
- *Content development stage:* requires a thorough study of all the scientific releases found on the topic and the repartition of the collected data according to the decided upon framework.
- *Finalizing stage:* calls for an additional step of proofreading and further alignment of the primary draft with the local and national standards, as well as the insertion of different graphics helping the expressiveness of the book.

RESULTS

The following is the cover to the primary version of the finalized handbook titled: Management of Frequent Visceral Surgical Emergencies in Pediatrics: A student's guide.

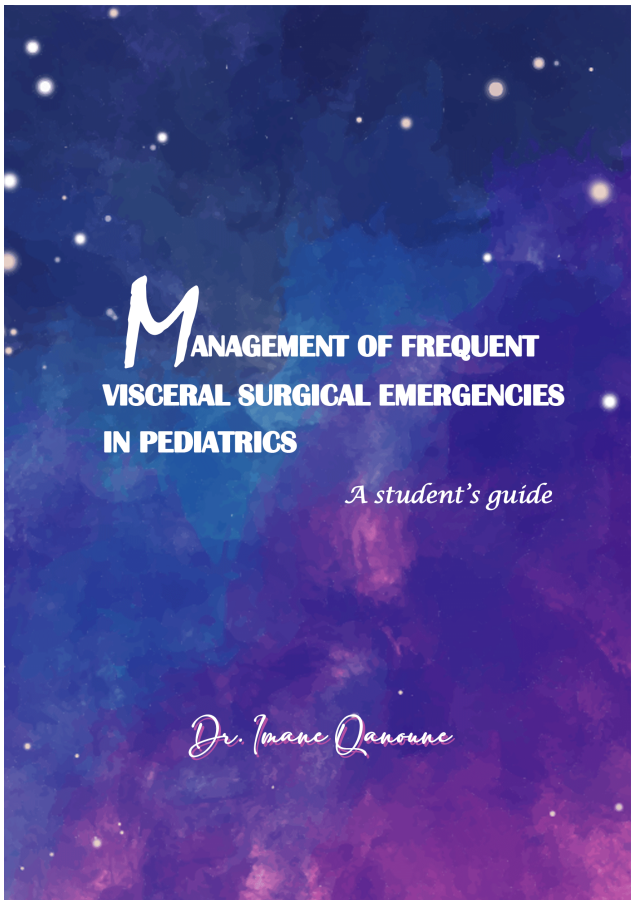


Fig.1: The book cover to the student's guide

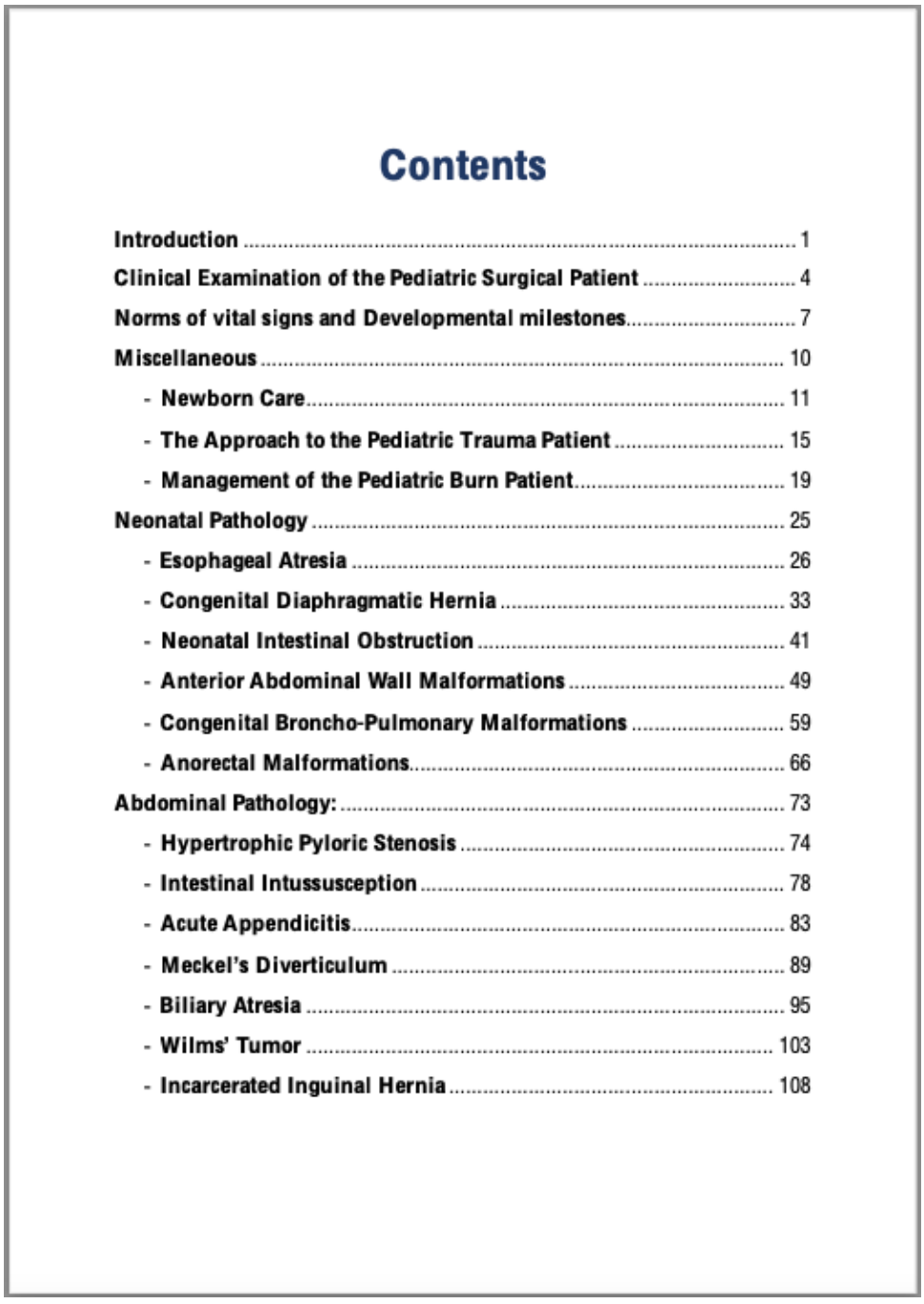
To review the entire document, the access is guaranteed by screening the following QR code and using the password: Qanoune.

Fig.2: The QR code to the student's guide

ANALYSIS

The student's guide is a 148 pages handbook on the subject of frequent visceral surgical emergencies in the pediatric population, while placing a great emphasis on the diagnosis part considering the targeted audience of the book represented by medical students and the innate belief that an accurate, promptly made diagnosis with a reasonable stratification of complementary examinations is the key to a timely and adequate management.

- The different chapters of the student's guide are as represented in the table of contents shown in **Fig.3** and **Fig.4**:



Contents

Fig.3: Table of contents to the student's guide – part 1

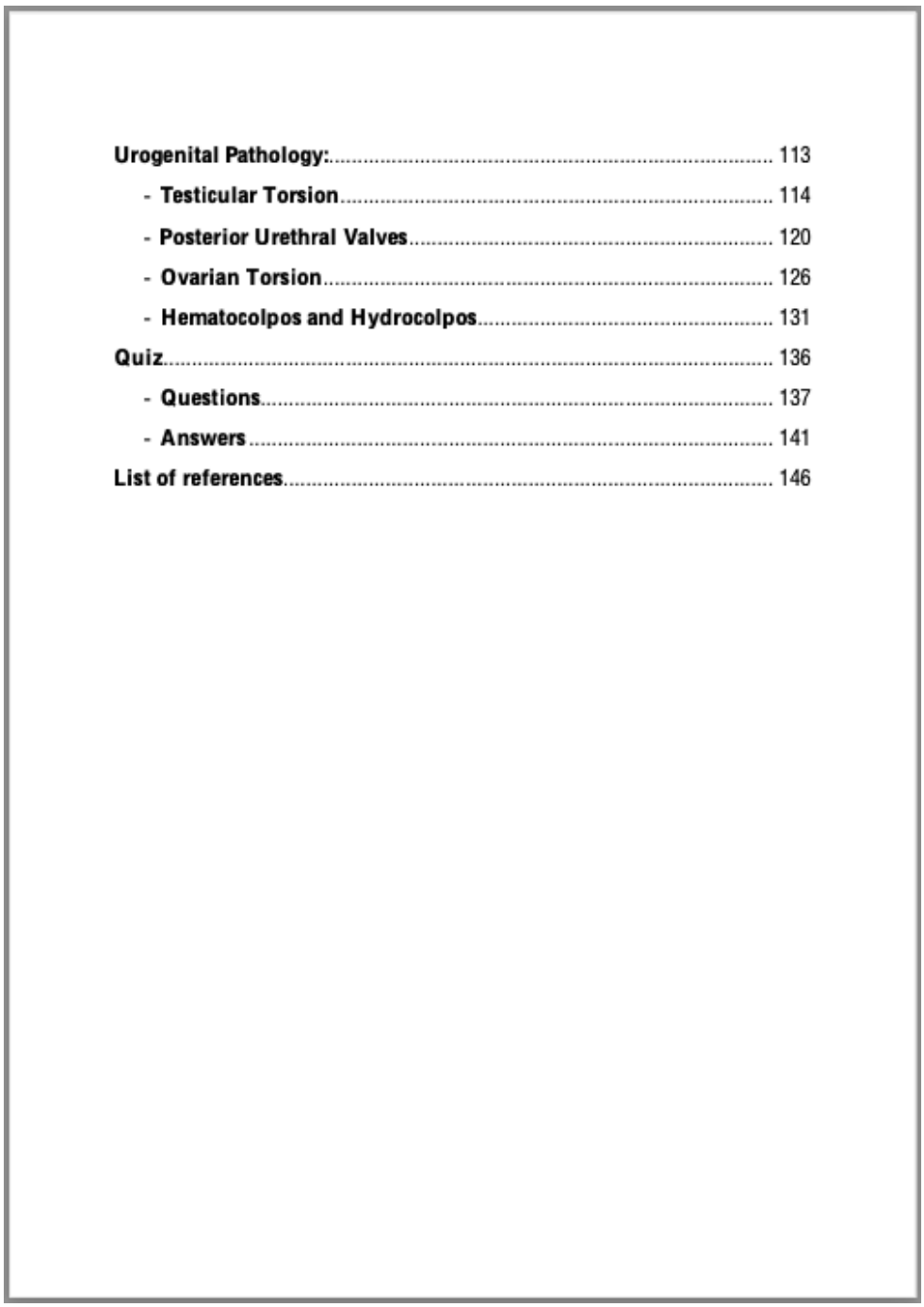
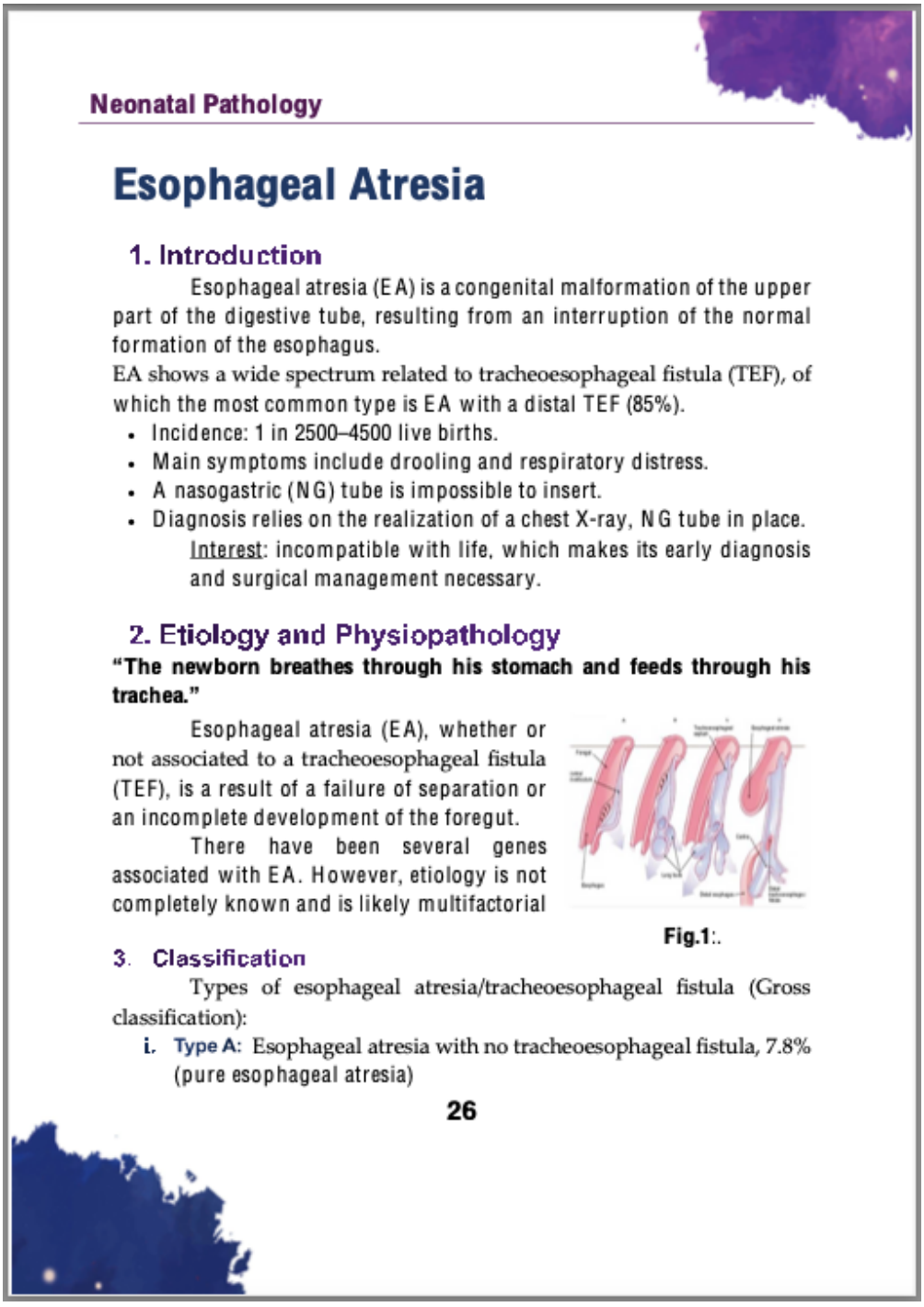


Fig.4: Table of contents to the student's guide – part 2

- An example of the general framework of the individual pathology is shown in the **fig 5-11**, subject to minor adjustments depending on the particularity of each given pathology.



Neonatal Pathology

Esophageal Atresia

1. Introduction

Esophageal atresia (EA) is a congenital malformation of the upper part of the digestive tube, resulting from an interruption of the normal formation of the esophagus.

EA shows a wide spectrum related to tracheoesophageal fistula (TEF), of which the most common type is EA with a distal TEF (85%).

- Incidence: 1 in 2500–4500 live births.
- Main symptoms include drooling and respiratory distress.
- A nasogastric (NG) tube is impossible to insert.
- Diagnosis relies on the realization of a chest X-ray, NG tube in place.

Interest: incompatible with life, which makes its early diagnosis and surgical management necessary.

2. Etiology and Physiopathology

"The newborn breathes through his stomach and feeds through his trachea."

Esophageal atresia (EA), whether or not associated to a tracheoesophageal fistula (TEF), is a result of a failure of separation or an incomplete development of the foregut.

There have been several genes associated with EA. However, etiology is not completely known and is likely multifactorial

Fig.1:.

3. Classification

Types of esophageal atresia/tracheoesophageal fistula (Gross classification):

i. Type A: Esophageal atresia with no tracheoesophageal fistula, 7.8% (pure esophageal atresia)

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Fig.5: Esophageal Atresia – Neonatal pathology, part 1

ii. **Type B:** Esophageal atresia and a proximal tracheoesophageal fistula, 0.8%.

iii. **Type C:** Esophageal atresia and a distal tracheoesophageal fistula, 85.8% (most common type).

iv. **Type D:** Esophageal atresia with both a proximal and distal tracheo-esophageal fistula, 1.4%.

v. **Type E:** Fistula to the trachea with no esophageal atresia, 4.2% (H-type fistula).

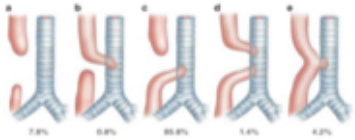

Fig.2

4. Associated Anomalies

The factor or factors responsible for the early disturbance in organogenesis causing EA may affect other organs or systems that are developing at the same time.

EA can be divided clinically into isolated EA and syndromic EA, occurring at roughly the same rate. The most frequent associated malformations encountered in syndromic EA are:

- Cardiac (13–34%)
- Vertebral (6–21%)
- Limb (5–19%)
- Anorectal (10–16%)
- Renal (5–14%).

Nonrandom associations have been documented as well. Two of these are the VACTERL association (Vertebral, Anorectal, Cardiac, Tracheo-Esophageal, Renal, and Limb abnormalities), and the CHARGE association (Coloboma, Heart defects, Atresia of the choanae, developmental Retardation, Genital hypoplasia, and Ear deformities).

Fig.6: Esophageal Atresia– Neonatal pathology, part 2

Neonatal Pathology

5. Diagnosis

A. Prenatal Diagnosis

- Fetal Ultrasound (US): relies, in principle, on two nonspecific signs: polyhydramnios and an absent or small stomach bubble.
  → Both of these signs can be associated with a wide range of fetal abnormalities and are nonspecific.
- Three-dimensional power Doppler imaging has been used both antenatally and postnatally.
- Fetal Magnetic resonance imaging (MRI) has been used to identify other fetal thoracic lesions, and may be beneficial in patients deemed to be at risk on prenatal ultrasound.

B. Postnatal Diagnosis

i. Clinical Presentation

- Excessive salivation and frothing are the classical features of EA.
- Choking, coughing, and episodes of cyanosis, especially with attempts to feed.
- A negative NG tube test: Inability to pass a nasogastric tube.
- Abdominal distension in case of a distal TEF.

ii. Investigation

- **Chest X-Ray**: constitutes the most informative imaging tool and the only one necessary for the positive diagnosis of EA.
  Obtained after inserting a nasogastric catheter.
  Catheter in place.
- the tip of the tube is found to be slightly curled in the blind upper pouch around T2–T4. This technique not only identifies the atresia but gives some clue about the length of the upper pouch.

Fig.3

If there is any question about the diagnosis, a small amount of contrast can be dripped into the upper pouch, but this needs to be done with fluoroscopy and under direction of the surgeon to ensure that the contrast is not aspirated.

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Fig.7: Esophageal Atresia – Neonatal pathology, part 3

Neonatal Pathology

- Air in the stomach suggests a distal TEF, while a "gas-less" appearance suggests pure EA.
- Associated duodenal atresia might be suggested with an overlarge stomach and duodenal bubbles.
- Cardiomegaly might suggest cardiac anomalies and there may be an abnormal silhouette suggestive of a right-sided aortic arch (right aortic knob).

Fig4

A chest x-ray is the only paraclinical exam necessary to the diagnosis of EA/TEF. However, as EA/TEF can be a part of a syndrome, the following exams can be obtained for a better anatomic study of the associated anomalies but, in truth, most of these advanced studies add little to the routine management of this congenital anomaly:

- **Echocardiogram**: used to define cardiac anatomy and screen for a right-sided aortic arch.
- **Renal US** and **Spine radiographs**.
- **Computed tomography** (CT) and **Magnetic Resonance Imagining** (MRI).
- **Karyotyping** and a consultation by a geneticist are recommended at some point when chromosomal anomalies are suspected.

6. Differential Diagnosis

The diagnosis of EA is based upon strong clinical suspicion and confirmed by a chest x-ray. The clinical and radiological signs of EA are practically pathognomonic leaving very little room for differential diagnosis. If needed, the investigation of differential diagnoses can be further extended by a variety of imaging from x-rays and CT scans to endoscopy and surgery.

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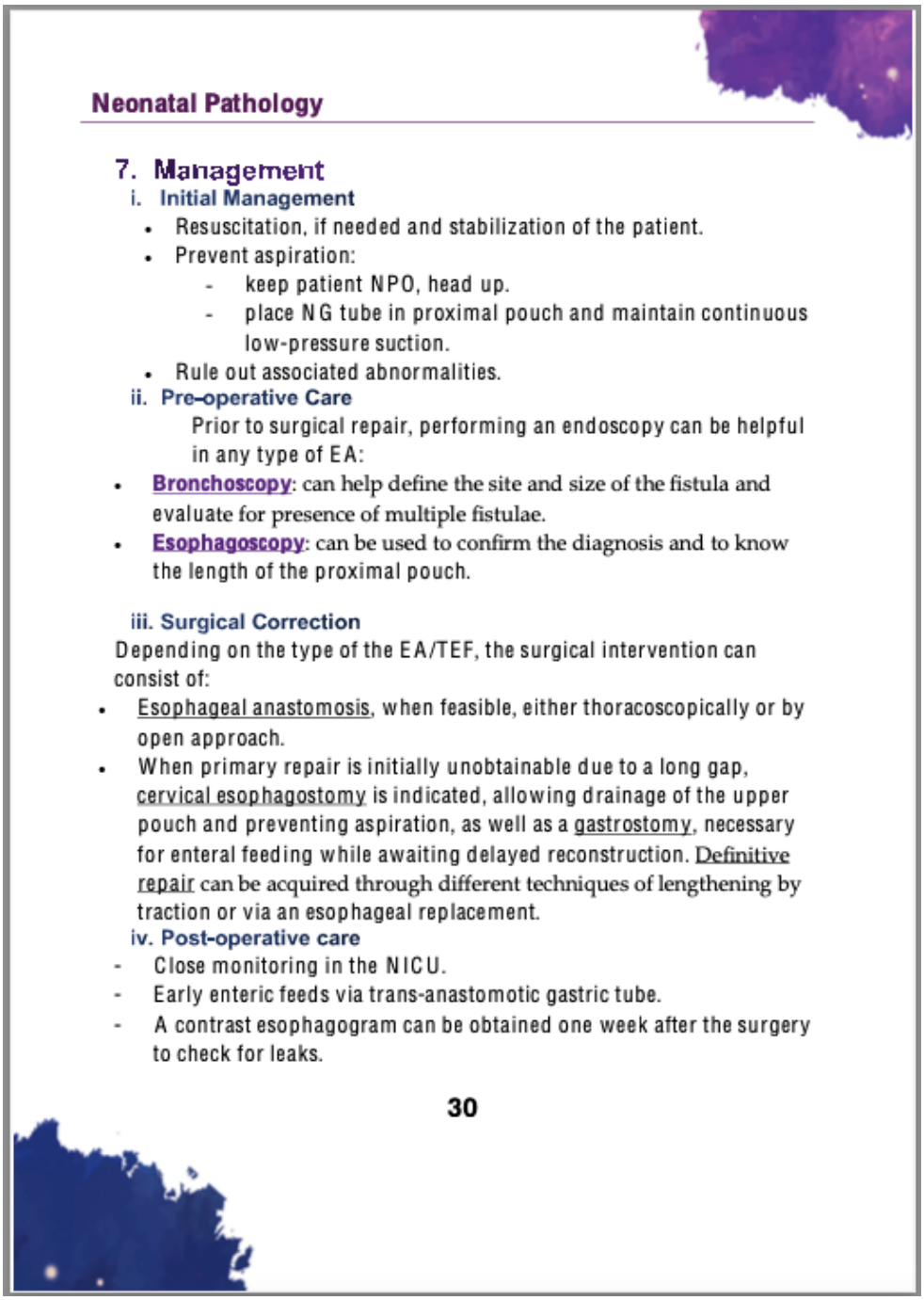
Fig.8: Esophageal Atresia – Neonatal pathology, part 4



Neonatal Pathology

7. Management

i. Initial Management

- Resuscitation, if needed and stabilization of the patient.
- Prevent aspiration:
  - keep patient NPO, head up.
  - place NG tube in proximal pouch and maintain continuous low-pressure suction.
- Rule out associated abnormalities.

ii. Pre-operative Care

Prior to surgical repair, performing an endoscopy can be helpful in any type of EA:

- **Bronchoscopy**: can help define the site and size of the fistula and evaluate for presence of multiple fistulae.
- **Esophagoscopy**: can be used to confirm the diagnosis and to know the length of the proximal pouch.

iii. Surgical Correction

Depending on the type of the EA/TEF, the surgical intervention can consist of:

- Esophageal anastomosis, when feasible, either thoracoscopically or by open approach.
- When primary repair is initially unobtainable due to a long gap, cervical esophagostomy is indicated, allowing drainage of the upper pouch and preventing aspiration, as well as a gastrostomy, necessary for enteral feeding while awaiting delayed reconstruction. Definitive repair can be acquired through different techniques of lengthening by traction or via an esophageal replacement.

iv. Post-operative care

- Close monitoring in the NICU.
- Early enteric feeds via trans-anastomotic gastric tube.
- A contrast esophagogram can be obtained one week after the surgery to check for leaks.

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Fig.9: Esophageal Atresia – Neonatal pathology, part 5

Neonatal Pathology

8. Evolution and Prognosis

i. Prognosis

EA is a condition incompatible with life; If not taken in charge, its evolution is lethal, with neonatal respiratory distress, inhalation, pneumonia, sepsis, severe dehydration and death. However, its management has benefited from recent improvements in surgical and peri-operative care with survival rates tending to exceed 90%.

Main prognostic factors include: prematurity, a low birth weight of <1.5kg and the association to a cardiac anomaly.

ii. Post-operative complications

- **Anastomotic leak**: can be life-threatening and warrants early re-exploration especially if a major intra-pleural disruption occurs.
- **Recurrent tracheo-esophageal fistula**: suspected if oral feeding produces coughing and choking. Investigate with contrast esophagogram ±bronchoscopy. Requires revision.
- **Anastomotic stricture**: Manifests as early feeding difficulty. Most respond to balloon dilatation(s).
- **Gastro-esophageal reflux (GER)**: common, but most are amenable to medical therapy. If refractory to medical treatment fundoplication is to be considered.
- **Tracheomalacia**: presents with stridor and cyanotic episodes. Investigated by bronchoscopy to show the airway collapse. Treated by aortopexy, tracheopexy, or even tracheostomy.

Fig.5

ii. Long term outcome

most result from a chronic GER disease and include:

- Dysphagia,
- Esophagitis,
- Barret's esophagus,
- Stricture formation,
- Silent aspiration responsible of respiratory morbidity,
- Failure to thrive,
- And an overall Impaired quality of life.

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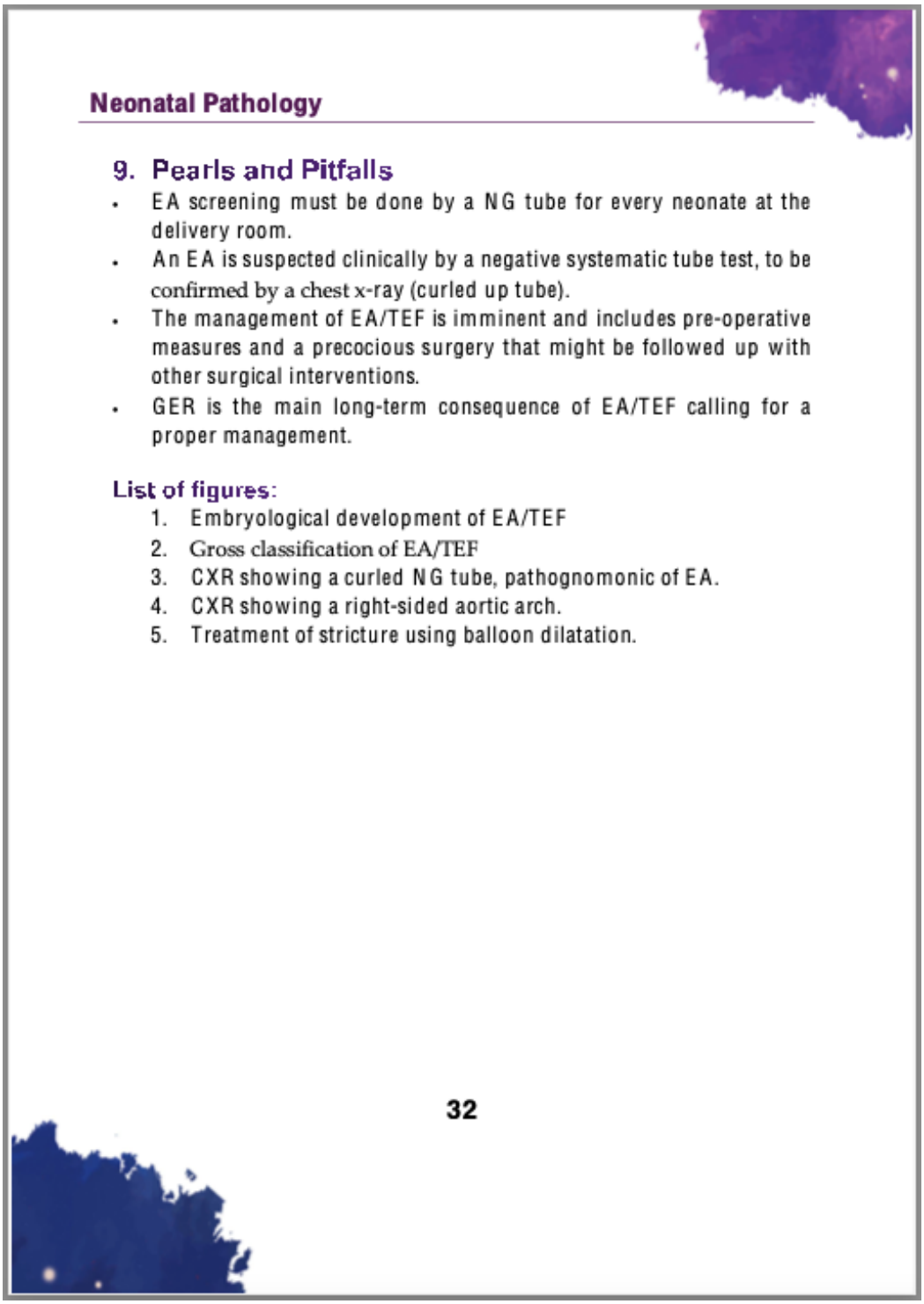
Fig.10: Esophageal Atresia – Neonatal pathology, part 6



Neonatal Pathology

9. Pearls and Pitfalls

- EA screening must be done by a NG tube for every neonate at the delivery room.
- An EA is suspected clinically by a negative systematic tube test, to be confirmed by a chest x-ray (curled up tube).
- The management of EA/TEF is imminent and includes pre-operative measures and a precocious surgery that might be followed up with other surgical interventions.
- GER is the main long-term consequence of EA/TEF calling for a proper management.

List of figures:

1. Embryological development of EA/TEF
2. Gross classification of EA/TEF
3. CXR showing a curled NG tube, pathognomonic of EA.
4. CXR showing a right-sided aortic arch.
5. Treatment of stricture using balloon dilatation.

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Fig.11: Esophageal Atresia – Neonatal pathology, part 7

DISCUSSION

According to our research, not many productions, if any, on the subject of pediatric surgery and the management of visceral emergency cases, have ever been published specifically targeting the medical student population, aside from the two following theses:

1. Hassnaa SAK

   Conduites à tenir devant les urgences chirurgicales viscérales pédiatriques: Manuel destiné aux étudiants de garde en chirurgie pédiatrique. 2017, Faculté de Médecine et de Pharmacie de Marrakech

2. Koto Toualouth LAFIA

   Guide pratique des urgences pédiatriques. 2017, Faculté de Médecine et de Pharmacie de Rabat

Although, given the wide disparities between the two theses set for reference, and our work, that is more focused on engaging its targeted audience and implementing an important emphasis on adopting a correct diagnostic approach, it only seems fair that we would not engage in a comparison of these significantly divergent productions.

Therefore, to further evaluate and assess our work, we have decided to implement the **Strengths Weaknesses Opportunities Threats (SWOT)** analysis method which has been developed to help with strategic planning by focusing on *building on strengths*, *minimizing weaknesses*, *seizing opportunities* and *counteracting threats*, and the results are the following:

1. **Strengths:**

- Made for students, by a student.
- Based on the latest scientific advances available.
- Lucid, simple and clear general framework.
- Distinct visual identity, appealing and easily readable and identifiable.

2. **Weaknesses:**

- Not inclusive of all pathologies.
- Lacking drug administration guidelines and recommendations.
- Lacking practical emergency room (ER) procedures.
- Lacking information about the legal and regulatory framework of exercise in the emergency room.
- General framework lacking flexibility.
- Limited number of cases in the quiz chapter.
- Time-consuming methods.

3. **Opportunities:**

- Expand the pathology chapter to include more diseases (specify thoracic trauma, abdominal trauma, urogenital trauma, foreign body aspiration, bites, caustic ingestion…).
- Consider an approach by clinical presentation rather than the underlying etiology (neonatal jaundice, acute abdomen, rectal bleeding…).
- Improve on the quality and quantity of figures included.

4. **Threats:**

- Difficulty to obtain information.
- Lack of officially documented local guidelines on the management of surgical emergencies in pediatrics.
- Lack of international consensus on many aspects of management and treatment.

RECOMMENDATIONS

The "Management of Frequent Visceral Surgical Emergencies in Pediatrics: A student's guide", as included in this thesis is the first version to a better upcoming rectified version. And the previously cited analysis following the SWOT method has called to attention a number of recommendations that would allow to improve this work, including the need to:

- Conduct a study on the most frequent visceral surgical cases encountered in the pediatric emergency room to help stratify by frequency the urgency to treat certain topics.
- Work on including additional chapters identified by frequency and/or gravity.
- Codify the management plan for each pathology from admission to discharge on the basis of clinical presentation including elements of history, physical examination, imaging modalities, laboratory tests, drug administration, operative interventions, as well as frequency and form of follow-up.
- Identify the legislative texts regulating the emergency room in our Moroccan context and implement them in creating a simplified informative text destined to students.
- Collaborate with a professional medical designer in order to obtain a uniform high-quality graphics.
- Include a chapter dedicated to treating the particularity of the pediatric emergency room (management of the dual stress of the patient and their caregiver, prevention of burnout…).
- Create a work group including keen medical students, pediatric surgery residents as well as professors to join forces in completing this demanding yet beneficial workshop.

CONCLUSION

In this pedagogic thesis, we have chosen to treat the subject of visceral surgical emergencies in the pediatric population, which we have approached by elaborating a student's guide on the most frequently encountered pathologies.

We have started this work with a very clearly set goal consisting of providing medical students with an academic tool that would assist them in managing these potentially life-threatening conditions, by inserting elements of physiopathology, largely incorporating elements of diagnosis including both clinical presentation and additional investigations, covering the basis of management and inserting the main traits of evolution and prognosis, all while being especially mindful of the targeted audience, requiring the endorsement of an inclusive, user-friendly and enjoyable tone aimed at engaging the learners and capturing their attention.

The production of this student's guide has incorporated citations from a large selection of e-books and articles, amounting for approximately a hundred references, most with very recent publishing dates and from very renowned journals and publishing companies (Springer, Elsevier and others), with the data being accommodated afterwards to meet the local guidelines and recommendations.

In addition, a specific attention was put into giving this student's guide an easily distinguishable and pleasing visual identity, and incorporating pertinent figures and investigation results with a direct impact on the educational value of the guide.

Despite the enormous efforts having been put into producing this student's guide in the best manner possible, this presented book is merely the first ever version with a lot of room for improvement, especially benefiting from the acquired results of tested and trusted evaluation methods.

ABSTRACT

ABSTRACT

Introduction: Visceral surgical emergencies in pediatrics encompass the different conditions representing an acute threat to life or function, emanating from external trauma, acute disease process, acute exacerbation of a chronic process, or complication of a surgical or other interventional procedure, interesting the abdominal cavity and abdominal wall, as well as endocrine glands and soft tissue, in the pediatric population.

the following student guide has been elaborated, in the context of a thesis to obtain the doctorate in medicine, with the aim of serving as a tool for medical students, assisting them in the process of management of certain frequent visceral surgical emergencies in pediatric patients, starting with the diagnosis, with a specific emphasis on the clinical aspect, in addition to the display of treatment plans and the anticipation of potential outcomes and evolution courses.

Materials and Methods: The information cited on this book has been cited from a large selection of books and articles as well as the material courses of visceral pediatric surgery having been taught at the faculty of medicine and pharmacy of Marrakech. The method has primarily consisted of the succession of three stages including a planning stage, a content development stage and a finalizing stage.

Results: The result has been the first *version* of the student's guide accessible through the QR code cited in **Fig.2**.

Analysis: The student's guide includes an introduction as well as the seven following chapters: clinical examination of the pediatric surgical patient, norms of vital signs and developmental milestones, miscellaneous (Newborn care, Trauma, Burns), neonatal pathology, abdominal pathology, urogenital pathology as well as a quiz.

Discussion: Not many similar works have been elaborated hindering the possibility of comparison. The student's guide on its own is a first attempt with a considerable room for

improvement according to the SWOT analysis results.

Conclusion: This work was elaborated with a clearly set goal of offering medical students an academic tool to assist them in managing potentially life-threatening conditions.

RÉSUMÉ

Introduction: Les urgences chirurgicales viscérales en pédiatrie englobent les différentes conditions représentant une menace aiguë pour la vie ou la fonction, émanant d'un traumatisme externe, d'un processus pathologique aigu, d'une exacerbation aiguë d'un processus chronique ou d'une complication d'une intervention chirurgicale ou d'une autre procédure interventionnelle, intéressant la cavité abdominale et l'abdomen, ainsi que les glandes endocrines et les tissus mous, dans la population pédiatrique.

Le guide de l'étudiant suivant a été élaboré, dans le cadre d'une thèse pour l'obtention du doctorat en médecine, dans le but de servir comme outil aux étudiants en médecine, les aidant dans le processus de prise en charge de certaines urgences chirurgicales viscérales fréquentes chez les patients pédiatriques, en commençant par le diagnostic, avec un accent particulier sur l'aspect clinique, en plus de la présentation des plans de traitement et de l'anticipation des pronostics potentiels et des cours d'évolution.

Matériels et méthodes : Les informations citées sur ce guide ont été extraites d'un large choix d'ouvrages et d'articles ainsi que des cours de chirurgie pédiatrique viscérale ayant été enseignés à la faculté de médecine et de pharmacie de Marrakech. La méthode a principalement consisté en la succession de trois étapes dont une étape de planification, une étape de développement de contenu et une étape de finalisation.

Résultats : Le résultat a été la première version du guide de l'étudiant accessible via le code QR cité dans la **Fig.2**.

Analyse : Le guide de l'étudiant comprend une introduction ainsi que les sept chapitres suivants : examen clinique du patient chirurgical pédiatrique, normes des signes vitaux et repères de développement, divers (Soins du nouveau-né, Traumatisme, Brûlures), pathologie néonatale, pathologie abdominale, pathologie urogénitale ainsi qu'un quiz.

Discussion : Peu de travaux similaires ont été élaborés, ce qui entrave la possibilité de

comparaison. Le guide de l'étudiant à lui seul est un premier essai avec une considérable marge d'amélioration selon les résultats de l'analyse SWOT.

Conclusion : Ce travail a été élaboré avec un objectif clairement défini d'offrir aux étudiants en médecine un outil académique pour les aider à gérer des conditions potentiellement mortelles.

ملخص

مقدمة: تشمل حالات الطوارئ الجراحية الباطنية في طب الأطفال الحالات المختلفة التي تشكل تهديدًا حادًا على الحياة أو الوظيفة، الناتجة عن صدمة خارجية، أو عن مرض حاد، أو عن تفاقم حاد لعملية مزمنة، أو عن مضاعفات إجراء جراحي أو تدخل آخر، في منطقة تجويف البطن وجدار البطن، وكذلك الغدد الصماء والأنسجة الرخوة، في الأطفال.

تم إعداد دليل الطالب التالي، في سياق أطروحة للحصول على الدكتوراه في الطب، بهدف جعله أداة لطلبة الطب، ولمساعدتهم أثناء عملية إدارة بعض حالات الطوارئ الجراحية الباطنية المتكررة في مرضى الأطفال، بدءًا من التشخيص، مع التركيز بشكل خاص على الجانب السريري، بالإضافة إلى عرض خطط العلاج وطرح أهم معالم تطور المرض والنتائج المحتملة.

المواد والأساليب: تم الاستشهاد بالمعلومات المذكورة في هذا الكتاب عن مجموعة كبيرة من الكتب الإلكترونية والمقالات بالإضافة إلى دروس جراحة الأطفال الباطنية التي يتم تدريسها في كلية الطب والصيدلية بمراكش. واشتملت طريقة إعداد الكتاب أساسا على تعاقب ثلاث مراحل بما في ذلك مرحلة التخطيط، ومرحلة تطوير المحتوى، ثم مرحلة الإكمال.

النتائج: كانت النتيجة هي الإصدار الأول من دليل الطالب الذي يمكن الوصول إليه من خلال رمز الاستجابة السريعة الموجود في***Fig2.***

التحليل: يتضمن دليل الطالب مقدمة بالإضافة إلى الفصول السبعة التالية: الفحص السريري للطفل المريض الجراحي، معايير العلامات الحيوية ومعالم النمو، مختلفات (رعاية الأطفال حديثي الولادة، الصدمة، الحروق)، أمراض حديثي الولادة، أمراض البطن، أمراض الجهاز البولي والتناسلي، بالإضافة إلى اختبار.

المناقشة: لم يتم نشر العديد من الأعمال المماثلة مما يصعب إمكانية المقارنة. دليل الطالب في حد ذاته هو محاولة أولى مع مجال واسع للتحسين وفقًا لنتائج تحليل***SWOT.***

الخلاصة: تم إعداد هذا العمل بهدف واضح وهو تزويد طلبة الطب بأداة أكاديمية لمساعدتهم في إدارة الحالات التي قد تهدد الحياة.

APPENDICES

Appendix 1 :

Pathology (x) Individual Chart:

Name of the chapter: N° of the pathology. Name of the pathology

- Resources
  - *Name of article /book nª1, year of release, page*
  - *Name of article /book nª2, year of release, page*
  - *Name of article /book nª3, year of release, page*
  - *…*
  - *Name of article /book nªx, year of release, page*
- *Suggested framework*
  - *Introduction: Definition, Epidemiology (prevalence, sex ratio, associated anomalies...), Interest (emergency…).*
  - *Etiology/ Physiopathology*
  - *Associated Anomalies*
  - *Diagnosis*
    - *Clinical Presentation*
    - *Additional Investigation*
  - *Differential diagnosis*
  - *Management/ Treatment*
  - *Evolution/ Prognosis*
  - *Pearls and Pitfalls*

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قسم الطبيب

أقْسِم بِالله العَظِيم

أن أراقبَ الله في مِهْنَتي .

وأن أصُونَ حياة الإنسان في كآفّة أطوَارهَا في كل الظروف والأحَوال باذلة وسْعِي في انقاذها من الهَلاك والمرَض والألَم والقَلَق .

وأن أحفَظَ للنَاس كرَامَتهُم ، وأسْتر عَوْرَتهُم ، وأكتمَ سِرَّهُمْ .

وأن أكونَ عَلى الدوَام من وسائل رحمة الله ، باذلة رعايتي الطبية للقريب والبعيد ، للصالح والطالح ، والصديق والعدو .

وأن أثابر على طلب العلم ، وأسَخِّرَه لِنَفْعِ الإِنْسَان لا لأذَاه .

وأن أُوَقّرَ مَن عَلَّمَني ، وأُعَلّمَ مَن ىَصْغرَني ، وأكون أختا لِكُلِّ زَميلٍ في المِهنَة الطِّبِّيَة مُتعَاونِينَ عَلى البرِّ والتقوى .

وأن تكون حياتي مِصْدَاق إىمَاني في سِرّي وَعَلانيَتي ،

نَقيَّة ممّا ىُشينهَا تجَاهَ الله وَرَسُوله وَالمؤمنين .

والله على ما أقول شهيد

كليـــــــة الطب
و الصيدلة - مراكش
FACULTÉ DE MÉDECINE
ET DE PHARMACIE - MARRAKECH

MARRAKECH
جامعة القاضي عياض
UNIVERSITÉ CADI AYYAD

سنة 2023 أطروحة رقم141

علاج الحالات الجراحية الباطنية المستعجلة الشائعة لدى الأطفال: دليل الطالب

الأطروحة

قدمت ونوقشت علانية 2023/03/30

من طرف

الآنسة إيمان قانون

المزدادة في 30 أبريل 1997 بآسفي

لنيل شهادة الدكتوراه في الطب

الكلمات الأساسية :

دليل الطالب – الحالات الجراحية المستعجلة – طب الأطفال – تشخيص – علاج –غرفة المستعجلات

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