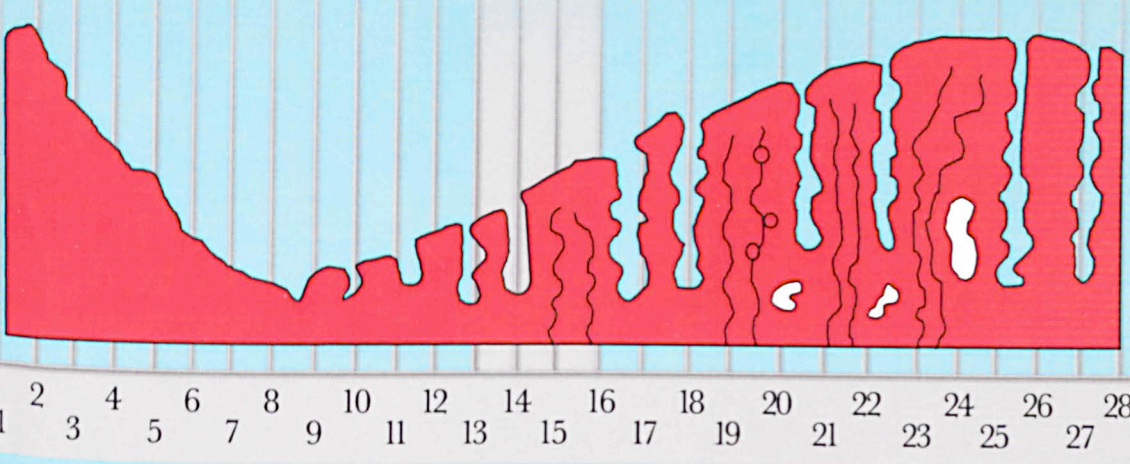
Dysfunctional Uterine Bleeding

Current Concepts

Methil Kannan Kutty
Siva Achanna
Nik Nasri Ismail



UNIVERSITI SAINS ISLAM MALAYSIA
جامعة العلوم الإسلامية الماليزية
ISLAMIC SCIENCE UNIVERSITY OF MALAYSIA

Dysfunctional Uterine Bleeding

Current Concepts

Dysfunctional Uterine Bleeding

Current Concepts

USIM Publisher
Universiti Sains Islam Malaysia
Bandar Baru Nilai
Negeri Sembilan
2011

FIRST PRINTING 2011

PUBLISHED In Malaysia by:

USIM Publisher
UNIVERSITI SAINS ISLAM MALAYSIA
71800 Bandar Baru Nilai
Negeri Sembilan, Malaysia
Tel : 06-798 8226 Faxs : 06-798 6083
www.penerbit.usim.edu.my

USIM PUBLISHER is a member of the
MALAYSIAN BOOK PUBLISHERS ASSOCIATION (MAPIM)

PRINTED in Malaysia by:

UKM Publisher
UNIVERSITI KEBANGSAAN MALAYSIA
43600 UKM, Bangi, Selangor
Tel : 03-8921 5371 | 3072 Faks : 03-8925 4575
penerbit@ukm.my

National Library of Malaysia Cataloguing-In-Publication-Data

Kutty, Methil Kannan
Dysfunctional uterine bleeding: current concepts / [Methil Kannan Kutty, Siva Achanna, Nik Nasri Ismail].
Includes index
ISBN 978-967-0393-00-1
1. Uterine hemorrhage. 2. Uterine hemorrhage--Chemotherapy.
I. Siva Achanna. II. Nik Nasri Ismail. III. Title.
618.172

CONTENTS

PREFACE		**vii**
ACKNOWLEDGEMENTS		**ix**
[Part 1]	**Pathology and Pathogenesis of Dysfunctional Uterine Bleeding**	**11**
Chapter 1	Dysfunctional Uterine Bleeding: Basic Facts	12
Chapter 2	Pathology And Pathogenesis	17
Chapter 3	Lesions Associated With Dysfunctional Uterine Bleeding	22
Chapter 4	Histological Appraisal of Endometrium	25
Chapter 5	Controversial Issues	27
	Summary	29
	Bibliography	30
[Part 2]	**Current Concepts in the Management of Dysfunctional Uterine Bleeding**	**33**
Chapter 6	Current Concepts of the Mechanism of Menstruation	34
Chapter 7	Dysfunctional Uterine Bleeding- A General Appraisal	37
Chapter 8	Medical Management of Dysfunctional Uterine Bleeding	46
Chapter 9	Surgical Considerations	50
Chapter 10	Techniques of Endometrial Ablation	54
Chapter 11	Operative Complications	59
	Summary	61
	Bibliography	63
ABBREVIATIONS		**71**
GLOSSARY		**73**
INDEX		**79**
ABOUT THE AUTHORS		**83**

PREFACE

The spectacular strides made in the kaleidoscopic spectrum of the etiology and treatment of dysfunctional uterine bleeding (DUB) prompted us to make an exciting venture for all those who are interested in recent trends in gynaecology and this *raison d' etre* for this book. Astounding progress in the state of the art, technology and progressive discoveries such as micro RNA etc. have impacted all facets of medical disciplines in unraveling molecular mechanisms of diseases including DUB. Cognizant of this scenario with the cutting edge of modern technology and its paramount importance in understanding the basic pathogenesis of DUB, we have touched on some of the breakthroughs for clearer comprehension of certain aspects that have, hitherto, remained unclear.

This book is the result of the amalgamation of ideas conceived by a Pathologist and two Gynaecologists; we hope that everyone interested in DUB will benefit from this book. We welcome any new suggestions that would further enhance the knowledge of the subject. It is self-evident that this chosen subject is of special interest to one and all in general practice and to gynaecologists in particular.

METHIL KANNAN KUTTY MD, FRCPATH, FRCPA
SIVA ACHANNA FRCOG
NIK NASRI ISMAIL FRCOG

ACKNOWLEDGEMENTS

Our deepest appreciation is due to our colleague Prof. Dr. Mohamed Adel Mohamed Abdel Rahim ElKadi, the editor of scientific publications in the Faculty, who was extremely and enthusiastically helpful with considerable patience in editing, type-setting and designing the manuscript.

We greatly acknowledge our colleague Associate Professor Dr. Parikial George Joseph for the proof-reading and his constant advice and comments during the preparation of this book.

They have given their precious time, effort and energy in immeasurable quantity and ungrudgingly in the preparation of this book.

THE AUTHORS

ABBREVIATION

AH	abdominal hysterectomy
AUB	abnormal uterine bleeding
COCP	combined oral contraceptive pill
cAMP	cyclic adenosine monophosphate
DMPA	depot medroxyprogesterone acetate
ET	endothelin
DHEA	dehydroepiandrostenedione
DUB	dysfunctional uterine bleeding
EEC	endometrial epithelial cells
ESC	endometrial stromal cells
FBC	full blood count
FGF	fibroblast growth factor
FSH	follicle-stimulating hormone
GnRH	gonadotrophic-releasing hormone
HMB	heavy menstrual bleeding
HPO-axis	hypothalamo-pituitary-ovarian-axis
HRT	hormone replacement therapy
HUVECS	human umbilical vein endothelial cells
IL	interleukin
IUCD	intrauterine contraceptive device
LH	luteinising hormone
LNG-IUS	levonorgestrel-releasing intrauterine system
MAUDE	Manufacturer and User Facility Device Experience
MBL	menstrual blood loss
MEA	microwave endometrial ablation
Micro RNA	micro ribonucleic acid
MMP	matrix metalloproteinase
MISTLETOE	minimally invasive surgical techniques-laser, endothermal or endoresection

MMP	Matrix metalloproteinase
MRI	magnetic resonance imaging
MVD	microvascular density
NHS	National Health Service
NICE	National Institute for Health and Clinical Excellence
Nd:Yag	Neodymium Yag laser
NSAIDS	nonsteroidal anti-inflammatory drugs
PAF	platelet activating factor
PBAC	pictorial blood loss assessment chart
PCOS	polycystic ovary syndrome
PGF	placental growth factor
PGSI	prostaglandin synthetase inhibitor
PGE	prostaglandin E
PGF	prostaglandin F
RCT	randomized controlled trials
REA	rollerball endometrial ablation
RA	rheumatoid arthritis
RITEA	radio-frequency-induced thermal endometrial ablation
SHBG	sex-hormone binding globulin
TBEA	thermal balloon endometrial ablation
TCRE	transcervical resection of the endometrium
TNF-α	tumour necrosis factor-α
TNFR	tumour necrosis factor receptor
TIMP	Tissue Inhibition of Metalloproteinases
TGF-ß	tumour growth factor-ß
TSH	thyroid stimulating hormone
TVS	transvaginal ultrasound
UAE	uterine artery embolisation
UK	United Kingdom
VEGF	vascular endothelial growth factor
vWD	von Willebrand disease

GLOSSARY

Dysfunctional uterine bleeding:
Excessive bleeding (excessively heavy, prolonged or frequent) of uterine origin which is not associated with complications of pregnancy, recognizable local pelvic disease or systemic disease.

Endometrium:
The mucous membrane lining the uterus, which becomes progressively thicker and more glandular and has an increased blood supply in the latter part of the menstrual cycle. This prepares the endometrium for implantation of the embryo, but if this does not occur much of the endometrium breaks down and is lost in menstruation. If pregnancy is established the endometrium becomes the decidua which is shed after birth.

Endometrial ablation:
The removal of the entire endometrium by means of an ablative technique, usually under hysteroscopic control and usually performed as a daycare surgery. It is an alternative to the traditional hysterectomies that were undertaken for the relief of menorrhagia.

Endometrial hyperplasia:
An increase in the thickness of the cells of the endometrium, usually due to prolonged exposure to unopposed estrogen, which can be endogenous, as in "anovular menstrual cycles" or exogenous, deriving from hormone replacement therapy or an estrogen secreting ovarian tumour. Atypical cells may or may not be present. The presence of atypical cells may indicate a high risk of endometrial carcinoma.

Estrogen:
A group of steroidal hormones including estriol, oestrone and oestradiol that control female sexual activities. They promote the growth and function of female sex organs. Estrogens are given through various routes for the amelioration of menopausal symptoms. Oestrogens are synthesized mainly by the ovaries while small quantities are produced by the adrenal cortex.

Gonadotrophin-releasing hormone (GnRH analogues:
Produced in the hypothalamus and transported via the bloodstream (hypophysial portal veins) to the anterior pituitary gland (the adenohypophysis), where it controls the synthesis and release of pituitary gonadotrophins which are also known as GnRH analogues. These are used in the treatment of endometriosis, fibroids, infertility etc. The hypothalamus is connected to the posterior lobe of the pituitary (the neurohypophysis) by nerve tracks. Synthesis of oxytocin and vasopressin occur in the hypothalamus before their transport to the pituitary where they are stored prior to release.

The GnRH agonists activate the GnRH receptor resulting in increased secretion of FSH and LH. After the initial stimulation action called a "flare" effect, eventually cause a sustained drop in gonadotrophin secretion known as "downregulation" eventually happens.

The GnRH antagonists block the GnRH receptor resulting in an immediate drop in gonadotrophin secretion. GnRH antagonists are primarily used in IVF treatment to block natural ovulation.

Hysterectomy:
The surgical removal of the uterus, either through an incision in the abdominal wall (abdominal hysterectomy) or through the vagina (vaginal hysterectomy). Subtotal hysterectomy involves removal of the body of the uterus and leaving the cervix. Hysterectomy does not affect sexual desire or activity.

Hysteroscopy (uteroscopy):
A tubular instrument with a light source for observing the interior of the uterus (direct visualization). The hysteroscope is carefully passed through the vagina and cervix and into the uterus.

Microwave endometrial ablation (MEA):
The MEA system is a surgical device that uses microwave energy to treat excessive menstrual bleeding by destroying the endometrial tissue lining the uterus. A long tube that delivers microwave energy is inserted into the uterus to destroy tissue.

Myometrium:
The muscular tissue of the uterus, which surrounds the endometrium. It is composed of smooth muscle that undergoes small, regular, spontaneous contractions.

Menstrual blood loss (MBL):
Discharge of blood and fragments of endometrium from the vagina at intervals of about one month in women of childbearing age. The normal menstrual blood loss is about 80 millilitres, beyond which the amount lost is considered pathological and needs investigations.

Menopause:
This is a period when the monthly menstrual bleeding ceases, usually around the age of 50 years. It heralds the failure of ovarian function and estrogen deficiency. This leads to vasomotor symptoms and loss of calcium leading to osteoporosis and cardiovascular instability.

Menorrhagia:
Abnormally heavy bleeding at menstruation, which may or may not be associated with abnormally long menstrual periods. Menorrhagia may be associated with hormonal imbalance (described as dysfunctional uterine bleeding), pelvic inflammatory disease, and fibroid uterus.

Menometrorrhagia:
This is a condition in which prolonged or excessive uterine bleeding occurs irregularly and more frequently than normal. It can be due to hormonal imbalance, endometriosis, uterine fibroids, or uterine malignancy. It can lead to anaemia in long-standing cases. Treatment depends on the cause.

Menstrual cycle:
Periodic sequence of events in sexually mature non-pregnant women by which an egg is released from the ovary at four-weekly intervals. If the ovum is not fertilized the cycle continues: the corpus luteum shrinks and the endometrium is shed, termed as menstruation. If fertilization occurs, the fertilized embryo gets attached to the endometrium and the corpus luteum continues to secrete progesterone until about 12 weeks. Thereafter the placenta takes over the function to secrete progesterone to maintain the pregnancy until term.

Nd YAG:
It is a method for hysteroscopic endometrial ablation introduced in the 1980s (first generation), also known as neodymium: yttrium-aluminium-garnet.

Ovulation:
The process by which an ovum is released from the mature "Graafian follicle". The fluid-filled follicle distends the surface of the ovary until a thin spot breaks down and the ovum floats out surrounded by a cluster of follicle cells (cumulus oophoricus) and starts traveling down the Fallopian tube to the uterus.

Pictorial blood loss assessment chart (PBAC):
A chart for recording the level of menstrual blood loss based on appearance of sanitary pads. On the basis of the chart results, the total amount of blood loss can be estimated.

Progesterone:
A steroid hormone secreted by the "corpus luteum" of the ovary, the placenta and small quantities by the adrenal cortex. It is responsible for preparing the inner lining (endometrium) of the uterus for pregnancy. If fertilization occurs, progesterone maintains the pregnancy and prevents further release of eggs from the ovary. The synthetic progesterone steroids are known as "Progestogens". Progestogens are major constituents of the contraceptive pills and other hormonal preparations.

Rollerball endometrial ablation (REA):
REA destroys the inner layers of the uterus using an electrically heated "rollerball".

Scottish Intercollegiate Guidelines Network (SIGN):
Established in 1993 to sponsor and support the development of evidence-based clinical guidelines for the National Health Service (NHS) in Scotland

Sex-hormone binding globulin (SHBG):
This is a glycoprotein that binds to sex hormones, specifically to testosterone and estradiol and to some degree, to serum albumin. Only a small fraction of these hormones is unbound or remain "free" and this portion is biologically active and able to enter a cell and activate its receptor. The SHBG inhibits the function of these hormones. Thus the bioavailability of sex hormones is influenced by the level of SHBG.

Thermal balloon endometrial ablation (TBEA):
TBEA destroys the inner layers of the uterus by transferring heat from heated liquid within a balloon inserted into the uterine cavity. The cotraindications for the application of TBEA is large or irregular uterine cavities caused by fibroids because the balloon must be in direct contact with the uterine wall to cause ablation.

Transcervical resection of the endometrium (TCRE):
The uterus is distended with fluid at constant pressure to permit resectoscopic visualization of the target area. Under video surveillance, a small wire electrocautery loop is used to excise the basal layer of the endometrium.

Transvaginal ultrasound:
Is a method of imaging the uterus, fallopian tubes and the ovaries. The ultrasound machine sends out high-frequency sound waves above 20,000 Hz inaudible to the human ear. It bounces off body structures to create a picture on a screen. The ultrasound transducer is inserted directly into the vagina. Ultrasound is a useful diagnostic imaging technique, being non-invasive. Results are immediate and repeatable.

Transabdominal ultrasound:
In this method the transducer is directly placed on the skin of the abdomen. In obese women the resolution and visualization of the pelvic structures are imprecise, therefore the transvaginal route is preferable.

Uterine artery embolisation (UAE):
Is an alternative therapy to hysterectomy for uterine fibroids. The procedure is performed under sedation. Both the uterine arteries are blocked by particles (gel foam) injected via femoral and uterine arteries. This blocks the blood supply to the fibroids and thus cause shrinkage. UAE is performed by an interventional radiologist.

Uterine fibroids:
These are smooth muscle tumours of the myometrium. They vary greatly in size from a few millimeters to tens of centimeters and are associated with heavy menstrual bleeding. Besides, they can also cause pressure symptoms and pain. They are generally benign and only a small percentage (< 1 %) transforms into malignancy.

INDEX

Ablation
- Balloon thermal 54, 56
- Cavarterm 56
- Cryoablation (Her option) 58-9
- Hydrothermal ablation 54,58
- LASER 51-52, 54-55, 60-61, 67, 71
- Microwave endometrial (MEA) 54, 57, 63, 69-71, 74
- Novasure (Impedence control bipolar radiofrequency) 54, 57-58, 69-70
- Rollerball endometrial 54-55, 68, 70, 72, 76
- Radiofrequency induced thermal endometrial (RITEA) 54, 57, 69, 72
- Thermablate 54, 56
- Transcervical 55, 67-70, 72, 77

Abnormal uterine bleeding 27, 34, 69, 71
Activation MMP 22, 31, 65
Adenocarcinoma 37, 52, 65
Adenomyosis 22, 37
Adrenal hyperplasia 27, 29
Amenorrhoea 34, 42, 50, 52, 58-59, 62
Androstenedione 25, 40, 71
Anaemia 37, 41, 44-46, 54, 64, 75
Androgens 24, 25, 28
Angiogenesis 12, 20-21, 31, 35
Anovulatory 12-14, 17, 24-25, 29, 37-38, 40-41, 49, 63
Antifibrinolytic agent 47
Apoptosis 12, 35
Aromatase 25
Atrophy 26, 50

Breakthrough bleeding 17-18, 26
17ß estradiol 19

cAmp 12, 63, 71
Carbamazepine 23
Cell surface receptors (VEGF-R1; VEGF-R2) 20
Cervical dysplasia 22
Cervical malignancy 22
Cervical polyp 22
Chemokines 19
Chemotherapy 23
Chlamydia 22
Chronic endometritis 26, 37
C-kit expression 20
Coagulopathy 23
COCP 47-49, 71
Collagenase-1 (MMP1) 22
Complications
- Non-hysteroscopic endometrial ablation 60
- Bladder and bowel 60

Condyloma acuminatum 22
Corticotropin-releasing hormone 23
Cox enzyme 47
Cushing's disease 14
Cytokines 19, 29

Danazol 47, 49-50, 65-67
Dysfunctional uterine bleeding (DUB) 12, 17, 22, 27, 30, 32-34, 37, 40, 42, 46, 63-65, 67-69, 71, 73, 75
Ectopic pregnancy 23
Electrocautery 59, 77
Endometrial biopsy 25, 32, 37-39, 52
Endometrial cancer 22

Endometrial hyperplasia (glandular, cystic,adenomatous,complex,atypical) 15, 24, 26, 63, 73
Endometrial polyp 37
Endothelial cells 19-21, 71
Endothelin 37, 71
EP receptors 18
Epidermal growth factor (EGF) 21, 62
Epidermal growth factor receptors (EGFR) 21
Ethamsylate 46-48, 65-66

Fibroblast growth factor (FGF) 21, 71
Fibrinolysis 48
Follicles 12, 14, 18
Follicular maturation 23, 28
Follicle stimulating hormone (FSH) 14, 23-25, 28, 40

Gene expression 12, 19, 25
Gene products 12
Gelatinase B (MMP-9) 22
Generation devices
  First 54-55, 60
  Second 45, 54, 56, 60-62
GnRH 12, 14, 23, 28, 35, 38, 41, 47, 50, 71, 74
GnRH analogues 41, 47, 74
Granulomas 26

Haemorrhage (secondary) 60
Hepatocyte growth factor 19-20
Hydatidiform mole 23
HPO-axis 13-14, 28, 40-41, 71
Human umbilical vein endothelial cells (HUVECS) 20, 31, 71
Hyperplasia
  Adenomatous 16
  Atypical 16, 27, 42, 73
  Complex 21, 27, 80
Hyperandrogenism 23, 32
Hyperinsulinaemia 24
Hyperprolactinaemia 14
Hyperthyroidism 14, 23, 27, 29
Hyponatraemia 59, 62
Hypothyroidism 23-24, 28, 46
Hysterectomy 34, 38-39, 45-46, 50-58, 61-62, 65, 67-68, 70-71, 74, 77

Iatrogenic 17
IL-13 19, 31
IL-15 19, 31
Intermenstrual bleeding 23, 34, 39
IUD 22

Laparoscopy 53, 59
Laparotomy 53, 59
Luteinizing hormone (LH) 12
LNG IUS 50

Macrophages 20
Mean score of endometrial microvascular density (MVD) 24, 72
medroxyprogesterone acetate (MPA) 19
Mefenamic acid 47
Menopause 13-14, 42, 75, 84
Menorrhagia 18-19, 30-31, 34, 37-38, 42-51, 54, 56, 61, 63-70, 73, 75
Menstrual blood loss 18-19, 43, 47, 49, 54, 64-65, 67, 71, 75-76
Menstrual disorders 30, 51, 62-63
Metallo proteinases (MMPS) 21-22, 35
micro RNA 12, 20, 30-31, 71
MISTLETOE study 60, 68
mRNA 19-21, 31

Neisseria gonorrhoea 22
Neutrophil 20, 22, 26
NF-κB 20
NF-κB activity 20
Nitric oxide 18-19, 31, 35, 63
NSAIDs 22, 47, 72

Obesity 13-14, 23-24, 30
Oestrogen 26, 32, 41, 73
Oral contraceptive pill (OCP) 23, 41, 47-48, 71
Ovarian granulosa cell 22

Paediatricians 62
Pelvic inflammatory disease (PID) 22, 75
Penicillin 23
Phenobarbital 23
Platelet activating factor (PAF) 72
Platelet fragility 47-48
Primary care physician 45, 62
Prolactin 24, 28, 40
Prostaglandins 12, 18, 30, 35, 47, 67
Protein malnutrition 23

Rheumatoid arthritis 23, 72

Secretory endometrium 34
Secretory phase 21, 35
Sex-hormone binding globulin (SHBG) 23-24, 28, 72, 76
Systemic lupus erythematosis 23
Steroids 12, 19, 23, 27, 31, 76
Steroid therapy 23
Stromelysin-1 (MMP-3) 21-22

Tamoxifen 21-22
Tertiary centres 62
Tetracycline 23
Thermachoice 54, 57
Tissue inhibitors of metalloproteinases (TIMP) 22
TNF receptor type 1 (TNFR) 19
Transforming growth factor 19
Tubal occlusion 28
Tuberculosis 23, 26
Tuberculous endometritis 26
Tumour necrosis factor TNF 19, 32, 72
Tyrosine protein kinase 20

Uterine leiomyoma 22
Uterine perforation 52, 54, 59-60

VEGF 19-21, 24, 31, 35, 63, 72

Warfarin 23

ABOUT THE AUTHORS

PROFESSOR DR. METHIL KANNAN KUTTY: MBBS (Madras), MD (Lucknow), FRCPath (Lond.), FRCPA (Aust.)
Presently he is Professor of Pathology in the Faculty of Medicine and Health Sciences of University Sains Islam Malaysia. He has held posts of Professor of Pathology in Universiti Teknologi Mara, International Medical University, Royal College of Medicine, Perak and King Faisal University, Dammam, Kingdom of Saudi Arabia. He was the Foundation Professor of Pathology in UKM and a visiting Professor to Madras University.

He has been actively engaged in Research both as a research worker and supervisor for post graduate-students (MSc and PhD). He is the recepient of Sir David Galloway Memorial Award from Singapore Academy of Medicine. Currently he also teaches post-graduate students in surgical sciences in UKM. He was an examiner for Primary FRCS of the Royal College of Sugeons, Ireland and FRCPA of Royal Australasian College of Pathologists. He was a collaborator of research with Professor Warwick Armstrong of California University on Nasopharyngeal carcinoma. He has more than 120 research publications in local and International peer reviewed journals.

PROFESSOR DR. SIVA ACHANNA: MBBS (Andhra), FRCOG (Lond), FICS (USA), FAMM (Malaysia)
Presently he is Professor of Obstetrics & Gynaecology at the Faculty of Medicine and Health Sciences of Universiti Sains Islam Malaysia (USIM). He worked as a senior consultant in many of the hospitals of the Ministry of Health (MOH). During this period with the Ministry of Health, he was actively involved with Maternal Mortality, Pregnancy Related Peri-operative Mortality Surveys and Quality Assurance Programmes to enhance maternal health care.

After retirement he took up the appointment as Professor of Obstetrics & Gynaecology at Universiti Malaysia Sarawak (UNIMAS) and the Royal College of Medicine, Perak (RCMP). He had been an examiner for undergraduates in both Public and Private Medical Schools in Malaysia and post-graduate conjoint board of examinations

in Obstetrics & Gynaecology at Universiti Sains Malaysia, University Kebangsaan Malaysia and University Malaya. He has 30 research papers published in both local and international journals. He is a member of the editorial board of The Medical Journal of Malaysia and also in the Royal College of Obstetricians & Gynaecologists (RCOG) Overseas Representative Committee for Malaysia.

PROFESSOR DATO' DR. NIK MOHD NASRI NIK ISMAIL: MBBCh (Alexandria, Egypt), FRCOG (London), FICS (USA)

Presently he is the Professor of Obstetrics & Gynaecology and the Founding Dean at the Faculty of Medicine & Health Sciences of Universiti Sains Islam Malaysia (USIM). He had served as the Head of the Department of O&G and also as Deputy Dean at the Faculty of Medicine Universiti Kebangsaan Malaysia (UKM). In 1986, he helped to start the Masters of O&G program at UKM. The Ministry of Health Malaysia appointed him as one of the permanent members of the National Committee on the Confidential Enquiry of Maternal Mortality in Malaysia until 2004. He started the Malaysian Menopause Society and spearheaded as the President for two terms. He was also the President of Malaysian Association of Maternal and Neonatal Health (MAMANEH) for three terms. He also served as the member of the international committees of these two societies. His main interest now is in Menopause and Hormone Replacement Therapy (HRT) and the care of High Risk Pregnancies.

He was an examiner for both undergraduate and postgraduate examinations at all public universities in Malaysia. He was also an examiner for under graduates at the National University of Singapore and postgraduate examiner in O&G in Pakistan.

He has published a book and contributed to several chapters in other books. He also published over 40 papers in the national and international journals. Currently he has co-authored another book for the use of medical students and trainees in O&G, which is in the print.

Dysfunctional Uterine Bleeding

The spectacular strides made in the kaleidoscopic spectrum of the etiology and treatment of dysfunctional uterine bleeding (DUB) make an exciting venture for all those who are interested in recent trends in gynaecology and this raison d' etre for this book. Astounding progress in the state of the art, technology and progressive discoveries such as micro RNA etc. have impacted all facets of medical disciplines in unraveling molecular mechanisms of diseases including DUB. Cognizant of this scenario with the cutting edge of modern technology and its paramount importance in understanding the basic pathogenesis of DUB, have been touched on some of the breakthroughs for clearer comprehension of certain aspects that have, hitherto, remained unclear.

ISBN 978-967-0393-00-1
2400
9 789670 393001
http://penerbit.usim.edu.my