ENDOMETRIAL ABLATION

Review

Submitted for Fulfillment of Master Degree in Obstetrics and Gynecology

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بسم الله الرحمن الرحيم

﴿قالوا سبحانك لا علم لنا إلا ما علمتنا
إنك أنت العليم الحكيم﴾

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LIST OF ABBREVIATIONS

CI	Confidence interval
CO2	Carbon dioxide
CPA	Cyproterone acetate
DUB	Dysfunctional uterine bleeding
DVT	Deep venous thrombosis
EA	Endometrial ablation
ELA	Endometrial laser ablation
ELITT	Laser interstitial hyperthermy endometrial laser intrauterine thermotherapy
FDA	Food and Drug Administration (United States)
GHz	Gigahertz
GnRH	Gonadotropin-releasing hormone
HCT	Hematocrit
HGB	Hemoglobin
HMB	Heavy menstrual bleeding
HPFB	Health Products and Food Branch (Canada)
HRT	Hormone replacement therapy
HTA	Hydro ThermAblator®
HTAC	Health Technology Advisory Committee (United States)
ITP	Idiopathic thrombocytopenic purpura
IUD	Intrauterine device
kHz	Kilohertz
kPa	Kilopascal
LAVH	Laparoscopic assisted vaginal hysterectomy
lb	libra (pound)
MBL	Menstrual blood loss
MEA	Microwave Endometrial Ablation™
Nd:YAG	Neodymium: yttrium-aluminum-garnet laser
NHSCRD	NHS Centre for Reviews and Dissemination (United Kingdom)
NSAIDs	Nonsteroidal antiinflammatory drugs
OR	Odds ratio
PMS	Premenstrual syndrome
psi	Pascal square per inch
QALY	Quality-adjusted life-year
®	Registered trademark
RBC	Red blood cell
TCRE	Transcervical resection of the endometrium
TM	Trademark
W	Watt

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INTRODUCTION

Dysfunctional uterine bleeding is one of the most common reasons for referral to a gynecologist. It is the main reason for consultation in more than 50% of women who undergo hysterectomy ***(NHSCRD, 1995)***.

In spite of good clinical acumen and appropriate investigations, it is possible that women may be subjected to many unnecessary gynecological procedures. A young woman with submucous myoma may be hysterectomized, a pubertal virgin with idiopathic thrombocytopenic purpura (ITP), may undergo hysteroscopy and curettage, and a young hypothyroid woman may be prescribed large amounts of hormones and probably undergo curettage by every different gynecologist she visits. The gynecologists must establish strategies that ensure that pertinent diagnosis is an integral part of their clinical armamentarium .In the words of Hippocrates, "You can not treat a patient unless you have arrived at a diagnosis ". The ability to diagnose menorrhagia, which is an extremely common condition, is vital and the gynecologist should apply common sense to the science of diagnosis. Appropriate treatment also requires patience on the part of the gynecologist. Fortunately, recent technical advances have produced a plethora of alternatives to hysterectomy providing the perplexed practitioner with a guide to plotting a course through this ever increasing maze of options ***(Sheth and Sutton, 1999)***.

Hysterectomy has, for a long time, been the definitive treatment for dysfunctional uterine bleeding ***(Lethaby and Hickey, 2001)***. It guarantees the cessation of menstrual blood loss, and most women are extremely

satisfied after the operation. However, it is a major surgical procedure with inherent risks and the potential for complications.

Although mortality from hysterectomy for benign disorders is low, short term morbidity may be as high as 42.8% ***(Dicker et al., 1982)***. There is also considerable concern with respect to the long term sequelae of hysterectomy, which may include premature onset of ovarian failure, psycho-sexual dysfunction, and urinary tract symptoms ***(Magos, 1990)***. In addition, the cost of the procedure and hospital stay are high.

Hysterectomy is more expensive than other treatment for DUB. But the use of vaginal route reduces the cost gap relative to endometrial ablation. ***(Power et al., 1993)*** proponents of LAVH have suggested that it's over all cost it would be less, in that it facilitates early discharge from the hospital and rapid return to reproductive employment. The costs of LAVH are twice those of abdominal hysterectomy. Trice those of vaginal hysterectomy and five times those of transcervical resection of the endometrium (TCRE) ***(Nezhat et al., 1994)***. However despite the higher operative cost, the total cost of treatment is less because of shorter hospital stay after LAVH ***(Raju, 1994)***.

Conservation of the uterus is increasingly being demanded; as nearly one half of all women with menorrhagia have no local pelvic pathology ***(Fraser1992)***. These patients are eminently suitable for endometrial ablation if they do not wish to preserve their fertility.

Recent advances in hysteroscopic technique now appear to offer an effective, less invasive, and certainly less costly approach to the management of dysfunctional uterine bleeding ***(James et al., 1992)***.

The first generation ablation techniques are assisted hysteroscopically, with direct, real-time visual monitoring of the uterine cavity, and are based on the use of laser electrosurgical techniques. . This surgical procedure permits preservation of the uterus and reduces uterine bleeding in most patients ***(Goldrath et al., 1981)***. They are designed to destroy the entire thickness of the endometrium .Although very effective, these techniques carry certain risks. Furthermore, they are often complex to perform and require an experienced surgeon. A second generation of endometrial ablation techniques is therefore being developed. These new procedures are technically simpler and carry fewer risks.

Since endometrial glandular tissue is present deep in the myometrium, ablation should therefore include endometrium and 2.5-3 mm of myometrium ***(Coulter et al., 1991)***. This means that surgery is best carried after endometrial suppression. Either danazol or gonadotrophin releasing hormone agonist may be used for endometrial suppression ***(Sutton and Ewen, 1994)***.

Furthermore, the latest surgical procedures offer a shorter convalescence and lead to fewer complications than abdominal hysterectomy ***(Hidlebaugh, 2000; Lethaby et al., 2000d)***. Many women prefer a less invasive surgical treatment, although the success of such a procedure is not always guaranteed ***(Lethaby and Hickey, 2001)***.

CHAPTER I

Physiological Background

Definition of menstruation:

The normal menstrual cycle is defined as having a mean interval of 28 ± 7 days, with a mean duration of 4±3 days. The amount of blood loss average 30ml per cycle but may be as high as 80ml.

Menstruation:

Normal menstrual bleeding caused by postovulatory estrogen-progesterone withdrawal is stable and precisely regulated ***(Speroff, Glass and Kase, 2005)***. The normal menstrual cycle is so predictable that women come to expect a characteristic pattern of flow. Therefore, minor deviations in their expected use of sanitary napkins or tampons may cause women considerable concern. The usual duration of menstrual flow is 4 to 6 days, but many women may have a flow for as little as 2 days or as many as 7 days ***(Speroff, Glass and Kase, 2005)***. Normal menstruation also tends to be consistent in the amount of blood that is lost. The usual volume of menstrual blood loss is 30 ml; a menstrual flow greater than 80 ml is considered abnormal ***(Speroff, Glass and Kase, 2005)***.

The frequency and duration of menstrual flow are mostly stable during a woman's reproductive years, but they commonly vary at the beginning and end of the reproductive years ***(Belsey and Pinol, 1997)***.

By age 25, more than 40% of cycles are 25 to 28 days in length; between the ages of 25 and 35, more than 60% of cycles are 25 to 28 days in length ***(Speroff , Glass , Kase . 2005).*** The cycles begin to lengthen again when women enter their 40s, as perimenopause approaches.

Based on the normal experience, menstrual bleeding more often than every 24 days or less than every 35 days deserves evaluation ***(Munster et al., 1992).*** The flow that lasts 7 or more days also deserves evaluation. A flow that totals more than 80ml per month usually leads to anaemia and should be treated ***(Higham et al. 1990)***.

In general, however, an effort to quantitate menstrual blood flow beyond historical information is not necessary because evaluation and treatment are responses to a patient's own perceptions regarding duration, amount, and timing of her menstrual bleeding. Although the correlation between a patient's perceptions and actual menstrual blood loss is poor, an individual patient's anxiety and concern deserve consideration and evaluation ***(Fraser et al., 1984)***.

Mechanism of menstruation:

The mechanisms underlying normal menstruation remain poorly understood but have been explained by three basic theories:

a) Vascular control in the endometrial spiral arteries.

b) Changes in local uterine haemostasis, and

c) Regeneration of the endometrium ***(Shaw, 1994)***.

Prostaglandins are involved in the vascular control of the spiral arterioles and may have a modulatory role because withdrawal of progesterone will enhance prostaglandin synthesis. Platelet plugging is one of the major haemostatic mechanisms in the peripheral haemostasis, but can only be demonstrated in the spiral arterioles of the endometrium in the first twenty hours following the onset of menstrual bleeding ***(Smith and Kelly 1987)***.

Menstrual blood form clots in the first instance and then the fibrin is broken down by the proteolytic enzymes plasmid formed by the fibrinolytic system. The rapid formation and degeneration of fibrin plugs may play a role in the control of menstrual bleeding. The appearance of clots in the menstrual fluid implies an over coming of the fibrinolytic system of the uterus, and is often a pointer to menorrhagia ***(Shaw, 1994)***.

Prostaglandins have both vosoconstricting and vasodilating properties and playing a role in the control of endometrial bleeding. Prostaglandin synthetase, a group of enzymes, converts arachidonic acid to primary prostaglandin which leads to the production of thromboxane A2 in platelets and prostacyclin in endothelial smooth muscle cells. Thromboxane A2 acts as a powerful vasoconstrictor and platelet aggregator whilst prostacyclin has an opposing effect on hemostasis and act as a potent vasodilator and inhibitor of platelet aggregation. Thus a careful balance between the two is needed to achieve haemostasis in the endometrium. An imbalance towards prostacyclin would lead to bleeding disorders ***(Shaw, 1994)***.

Extensive research during recent years suggests that most excessive uterine bleeding is due to local endometrial or myometrial