Prevalence of Cesarean Section Niche in Women with Unexplained Abnormal Uterine Bleeding

Thesis

Submitted for the Partial Fulfillment of the Master's Degree in Obstetrics and Gynecology

By

Ismail El-Husen Abbas El-Dawa

(M.B.B.Ch), 2009

Faculty of Medicine - Ain Shams University

Resident of Obstetrics and Gynecology

Biala Central Hospital

Under the Supervision of

Prof. Mohamed Ibrahim Mohamed Amer

Professor of Obstetrics and Gynecology

Faculty of Medicine - Ain Shams University

Dr. Mortada El-Sayed Ahmed

Lecturer in Obstetrics and Gynecology

Faculty of Medicine - Ain Shams University

Faculty of Medicine

Ain Shams University

2018

Acknowledgement

First of all I thank Allah for his great mercy and help to complete this work.

I would like to express my deepest gratitude and sincere appreciation to Dr. Mohamed Ibrahim Mohamed Amer, Professor of Obstetrics and Gynecology, Faculty of Medicine, Ain Shams University and Dr. Mortada El-Sayed Ahmed, Lecturer in Obstetrics and Gynecology, Faculty of Medicine, Ain Shams University for their continuous encouragement and valuable advice to bring this work to light.

I would like to express my deepest appreciation to the Early Cancer Detection Unit for continuous help and support.

I would like to thank all patients for their patience, cooperation and for helping me to complete this work.

And last but, by no means least, I would like to thank my family for all their patience, love, support and sacrifice which made this work possible.

Last but not least, I dedicate this work to my family, whom without their sincere emotional support, pushing me forward this work would not have ever been completed.

Ismail El-Husen Abbas El-Dawa

List of Contents

List of Abbreviations

Abb.	Full term

ACOG ..... *American College of Obstetrician and Gynecologists*
AUB ..... *Abnormal uterine bleeding*
BFGF ..... *Basic fibroblast growth factor*
BMI ..... *Body mass index*
BTB ..... *Break through bleeding*
CE-MRI ..... *Contrast-enhanced magnetic resonance imaging*
CI ..... *Confidence interval*
CS ..... *Cesarean section*
CSD ..... *Cesarean scar defect*
CTGF ..... *Connective tissue growth factor*
GIS ..... *Gel instillation sonohysterography*
HMB ..... *Heavy menstrual bleeding*
HPMB ..... *Heavy and prolonged menstrual bleeding*
HSC ..... *Hysteroscopy*
IMB ..... *Intermenstrual bleeding*
LUS ..... *Lower uterine segment*
LUS ..... *Lower uterine segment*
OR ..... *Odd ratio*
PCDS ..... *Previous cesarean delivery scar*
PDGF ..... *Platelet derived growth factor*
PMB ..... *Post menopausal bleeding*
RR ..... *Relative risk*
SCSH ..... *Saline contrast Sonohysterography*
SCSH ..... *Saline contrast sonohysterography*
SHG ..... *Sonohysterography*
SIS ..... *Saline instillation sonohysterography*
TOL ..... *Trial of labour*
TOLAC ..... *Trial of labour after cesarean*
TVS ..... *Transvaginal ultrasound*
WHO ..... *World Health Organization*

List of Tables

List of Figures

List of Figures (Cont...)

List of Figures (Cont...)

INTRODUCTION

In the middle of the 20th century there was a rising of cesarean section rates worldwide. Over the last few decades cesarean section (CS) rates have continued to rise. In the UK the CS rate increased from 12 to 29% between 1990 and 2008 ***(Betran et al., 2007)***. In the USA in 2011 one in three women delivered by CS, whereas in China the CS rates have even risen from 2% in 1985 to 36–58% in 2010 and in Brazil from 15% in 1970 to even 80% in the private sector in 2004 ***(Barros et al., 2011; Deng et al., 2014; Feng et al., 2014; Osterman and Martin, 2014)***.

There is no discussion that a CS is a lifesaving procedure for some women, for example: for women with placenta previa or truly obstructed labor or for babies with proven distress either antenatal or intrapartum. Also, women with a breech pregnancy or a twin pregnancy are likely to benefit from a CS, albeit that the large majority of them will do well without a CS (***Hofmeyer et al., 2015; Roberts et al., 2015; Vlemmix et al., 2015)***. The World Health Organization (WHO) estates the optimal CS rate at 15% ***(Gibbons et al., 2010)***. As the procedure became safer and under the excuse to reduce newborn morbidity and mortality there was an increase in number of these procedure.

The increasing CS rate has stimulated an interest in the potential long-term morbidity of CS scars ***(Diaz et al., 2002; Silver, 2010; Clark and Silver, 2011)***. In the last decades

scientists became aware of gynecological symptoms after a CS, such as abnormal uterine bleeding, dysmenorrhea, chronic pelvic pain and dyspareunia ***(Wang et al., 2009; De Vaate et al., 2011; van der Voet et al., 2014)***.

Already in 1999 it was postulated that these symptoms could be related to an incompletely healed uterine scar, also called a niche. Patients with abnormal uterine bleeding (AUB) who had undergone prior cesarean sections, specially post-menstrual spotting may be due to scar defects left in uterus by the surgery, forming a diverticulum, an anomaly called "isthmocele" or "cesarean scar syndrome" ***(Morris, 1995).***

However, a generally accepted definition of a niche is still under debate. Alternative terms for a niche are cesarean scar defect, deficient cesarean scar, diverticulum, pouch and isthmocele. Interest in the potential clinical relevance of a niche has increased in the last few years and a growing number of studies on the subject have been published. Various methods to detect and measure a niche have been described ***(De Vaate et al., 2011)***.

This niche in the caesarean scar could be a cause of abnormal bleeding due to the collection of menstrual blood in a uterine scar defect causing post-menstrual spotting ***(Thurmond et al., 1999)***. The term 'niche' describes the presence of a hypo-echoic area within the myometrium of the lower uterine segment, reflecting a discontinuation of the myometrium at the site of a previous CS ***(De Vaate et al., 2011; Naji et al., 2012)***. A wedge-shaped defect in the uterine wall following CS was first described using hysterosalpingography in 1961 ***(Poidevin,***

1961). It is preferred to use the term 'niche', which was introduced by Monteagudo et al. in 2001 ***(Monteagudo et al., 2001)***.

Niches were defined as indentations of the myometrium of at least 2 mm ***(De Vaate et al., 2011; van der Voet et al., 2014)***. Large niches occur less frequently, with an incidence varying from 11 to 45% dependent on the definition used (a depth of at least 50 or 80% of the anterior myometrium, or the remaining myometrial thickness ≤ 2.2 mm when evaluated by TVS and ≤ 2.5 mm when evaluated by sonohysterography) ***(De Vaate et al., 2011; De Vaate et al., 2014; van der Voet et al., 2014)***.

Later prospective cohort studies reported abnormal uterine bleeding in about 30% of women with a niche at 6–12 months after their CS compared with 15% of women without a niche after CS. Various methods to detect and measure a niche have been described. The majority of papers have evaluated the niche with the use of transvaginal sonography (TVS), Saline contrast sonohysterography (SCSH) and Gel instillation sonohysterography (GIS) ***(Bij de Vaate et al., 2011)***, but a minority have used hysteroscopy ***(Fabres et al., 2003)*** or hysterosalpingography ***(Ofili-Yebovi et al., 2008)***.

Based on both the limited available evidence in combination with observations during sonographic, hysteroscopic and laparoscopic evaluation of niches hypotheses have been postulated on niche development ***(Vervoort et al., 2015).***

Post-menstrual spotting seems to be a predominant symptom in women with a niche ***(Valenzano et al., 2006; De Vaate et al., 2011)***. The first publications on caesarean section scar defects in relation to bleeding symptoms date from 1975 ***(Stewart et al., 1975).*** Since then many articles have reported a high prevalence of niches in women with abnormal uterine bleeding, including prolonged menstruation or post-menstrual spotting ***(Regnard et al., 2004: Fabres et al., 2003; Thurmond et al., 1999; De Vaate et al., 2013)***.

Thurmond et al. (1999) suggested that AUB occurrence may be due to a retraction of the scar tissue causing a dilation of the lumen or a pseudo cavity in the lower segment, which is limited in the upper portion by the endometrium and myometrium thickening, blocking the area in several degrees. According to these authors, the causes of such changes are unknown, but may be attributed to differences in the healing process of each side of the incision.

Fabres et al. (2003) stated that despite the scarcity of studies on this subject post-menstrual bleeding may be explained either by the mechanical obstruction caused by the thickness of the superior edge of cesarean section scar, or due to the accumulation of blood in the diverticulum.

It is important to underline that diagnostics and treatment should only be considered in case of symptomatic women in order to avoid 'too much medicine' ***(Moynihan and Smith, 2002)***.

Aim of the Work

The aim of this study is to assess the prevalence of cesarean section niche in women with unexplained abnormal uterine bleeding.

Chapter 1
CESAREAN SECTION NICHE

Over the last few decades Caesarean section (CS) rates have continued to rise ***(Betran et al., 2007).*** There is no discussion that a CS is a lifesaving procedure for some women, for example for women with placenta previa or truly obstructed labour, or for babies with proven distress either antenatal or intrapartum. Also, women with a breech pregnancy or a twin pregnancy are likely to benefit from a CS, albeit that the large majority of them will do well without a CS ***(Hofmeyer et al., 2015).*** The WHO estates the optimal CS rate at 15% ***(Gibbons et al., 2010).***

The increasing CS rate has stimulated an interest in the potential long-term morbidity of CS scars ***(Diaz et al., 2002).*** In the last decades scientists became aware of gynecological symptoms after a CS, such as abnormal uterine bleeding, dysmenorrhea, chronic pelvic pain and dyspareunia ***(Wang et al., 2009***).

Researchers have observed the presence of a niche at the site of the cesarean scar. The term 'niche' is a sonographic finding describes the presence of anechoic area within the myometrium of the lower uterine segment, reflecting a discontinuation of the myometrium at the site of incision of a previous CS ***(Monteagudo et al., 2001).*** Alternative terms for a niche are cesarean scar defect ***(Wang et al., 2009),*** deficient cesarean scar ***(Ofili-Yebovi et al., 2008),*** diverticulum

(Surapaneni et al., 2008), pouch ***(Fabres et al., 2003)*** and isthmocele ***(Borges et al., 2010).***

Several studies have demonstrated that a niche may be responsible for abnormal uterine bleeding in women with a previous CS. However, most studies included women with gynecological complaints such as dysmenorrhea, chronic pelvic pain and dyspareunia ***(Monteagudo et al., 2001).***

Thurmond et al., ***(1999)*** was postulated the hypothesis that a niche in the CS scar could be a cause of abnormal bleeding due to the collection of menstrual blood in a uterine scar defect causing post-menstrual spotting. Later prospective cohort studies reported spotting in 30% of women with a niche at 6–12 months after their CS compared with 15% of women without a niche after CS.

Morphological abnormalities in the CS scar can be visualized using transvaginal sonography (TVS), gel or saline instillation sonohysterography (GIS or SIS) or hysteroscopy (**Figure 1).** A wedge-shaped defect in the uterine wall following CS was first described using hysterosalpingography in 1961. Niches are defined as indentations of the myometrium of at least 2 mm ***(De Vaate et al., 2011).***