Omission of controlled cord traction during Active management of third stage of labor

Thesis

Submitted for Partial Fulfillment

Of

Master Degree in Obstetrics and Gynecology

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M.B.B.Ch., 2008

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2013

ACKNOWLEDGEMENTS

Firstly and foremost thanks to **God** *almighty who enabled me to carry out this work and every work.*

The words can never express my infinite gratitude and respectful appreciation to **Professor Dr. Mahmoud AlyAhmed El-Shourbagy** *Professor of Obstetrics & Gynecology Faculty of Medicine, Ain-Shams University for his valuable fatherly guidance, instructive supervision and his intensive support. Without his continuous encouragement and generous advice this work would not have been possible.*

I would like to extend my sincere gratitude and express my deepest thanks to **Dr. Tamer Ahmed El-Refaie** *Lecturer of Obstetrics & Gynecology Faculty of Medicine, Ain-Shams University for his continuous encouragement, generous attitude as well as his tremendous effort in carrying out this work. He has been hand in hand with me throughout all phases of this work.*

Finally my truthful affection and love to My Family, who were and will always be, by my side all my life.

Ahmed soliman

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LIST OF ABBREVIATIONS

AMTSL	Active management of the third stage of labor
CCT	Controlled cord traction
FIGO	The International Federation of Gynecology and Obstetrics
ICM	The International Confederation of Midwives
LH	Luteinizing Hormone
PPH	Postpartum Hemorrhage
SOGC	Society Of Obstetricians And Gynecologists Of Canada
WHO	World Health Organization

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INTRODUCTION

The third stage of labor refers to the period between birth of the baby and complete expulsion of the placenta. After the child is born, the uterus contracts to ensure mechanical hemostasis. Uterine contraction causes occlusion of the gaping arteries and stops the bleeding. The extent of blood loss associated with placental separation and expulsion depends on the speed of this separation from the uterine wall and on the effectiveness of the uterine muscle contraction around the placental bed and blood vessels during and after the separation. In cases of uterine atony, this mechanical hemostasis does not occur, or is defective, leading to plentiful and possibly fatal bleeding.

Because placental expulsion is thus a critical window for the prevention of postpartum hemorrhage (PPH) due to atony ,a variety of different management strategies have been proposed for this stage of delivery which include 'active management' and 'expectant or physiological management' **(Festin et al.,2003).**

Active management of the third stage of labor (AMTSL), first described in the United Kingdom and in Ireland, consists of the combination of the following three operations: administration of oxytocin immediately after delivery of the anterior shoulder or delivery of the baby ,early cord clamping and cutting, and controlled cord traction whereas expectant management is a “hands-off” passive physiologic approach where the attendant

awaits spontaneous expulsion of the placenta **(Begley et al ,2010)**.

Nowadays AMTSL is modified as early cord clamping is generally no longer included **(SOGC,2009, WHO,2007)** as evidences suggest that delayed clamping benefits the child **(Hutton and Hassan 2007 , Rabe et al.,2007)** even though the risks and benefits for the mother have still not been assessed but various international agencies such as the World Health Organization(WHO), the International Confederation of Midwives (ICM) and the International Federation of Gynecology and Obstetrics (FIGO) now recommend deferring cord clamping for three minutes **(FIGO, 2006).**

Uterine massage, on the other hand, is often added (**SOGC, 2009**) but it wasn't added in the WHO PPH Prevention Guidelines published in 2007.

Active management of the third stage of labour has been proved to reduce the incidence of PPH by approximately 65% compared with expectant management **(Prendiville et al., 2000).** This demonstrated efficacy explains why this active management has been included in recent international recommendations, especially by the FIGO, the ICM and by the WHO, as well as in national guidelines in several countries.

The specific and independent efficacy of preventive oxytocin during AMTSL has been shown by a good level of proof, **(WHO, 2007, Cotter et al., 2001, Elbourne et al., 2001).** It is therefore often considered the essential component of active management of third stage.

Apart from the administration of oxytocin , the impact and the relative contribution of other commonly used components of active management, such as controlled cord traction,(**Khan et al.,1997**) and uterine massage (**Hofmeyr *et al.*,2008**) in preventing PPH is still unclear.

The situation is very different for the controlled cord traction which requires special training that might be cost effective and not available especially in rural areas besides the possible complications that may occur if faulty techniques used by untrained birth attendants.

Cord traction was introduced into obstetric practice by Brandt (1933) and Andrews (1940) by the so-called Brandt-Andrews maneuver. The aim is to facilitate the delivery of a placenta that is already separated. In 1962 the term controlled cord traction (CCT) was introduced which aims to facilitate the separation of the placenta once the uterus contracts**.**

In performing CCT placental separation is not waited and once the uterus contracts the CCT is initiated. The third stage is usually completed in less than 10 minutes when CCT is used. Controlled cord traction (CCT) begins with the first firm uterine contraction, even in the absence of any clinical sign of placental separation. The attendant stands to the woman's right, left hand on the lower abdomen to grasp the lower segment between the thumb and index finger and to exert steady pressure upwards and backwards. At the same time, he or she holds the cord in the right hand; grip secured with avascular clamp at the level of the vulva, and exerts steady

cord traction downwards and backwards, exactly countered by the upward pressure of left hand, so that the position of the uterus remains unchanged. The traction begins gently at first and increases progressively until the placenta is expelled **(Spencer, 1962).**

There is concern by clinicians, based on teachings from their pre-service education that traction on the cord prior to placental separation may lead to maternal complications such as avulsion of the cord from the placenta, uterine inversion, incomplete placental expulsion and pain. There is not a large body of direct evidence for or against effects of controlled cord traction in isolation (**Althabe et al., 2009, Gülmezoglu *et al.*, 2012**).

Evaluation of CCT component is important because if it does not add any beneficial effects it can be dropped from the AMTSL package with important programmatic implications besides the WHO also identified the determination of the specific effect of CCT as a research priority for PPH prevention, (**WHO, 2007**) .

AIM OF THE WORK

The aim of the present study is to evaluate the individual and specific role of CCT as a part Of AMTSL in preventing PPH.

THE PLACENTA

The placenta is the organ of transfer between the mother and the fetus. Despite no direct communications between the fetal blood (contained in the fetal capillaries in the intravillous space of the chorionic villi) and the maternal blood (which remains in the intervillous space), there is transfer of oxygen and nutrients from the mother to the fetus at the maternal–fetal interface. Conversely, there is transfer of carbon dioxide and other metabolic wastes from the fetus to the mother ***(Cunningham et al., 2010a).***

The only exception is the occasional development of breaks in the chorionic villi, permitting the escape of fetal erythrocytes and leukocytes into the maternal circulation ***(Cunningham et al., 2010a).***

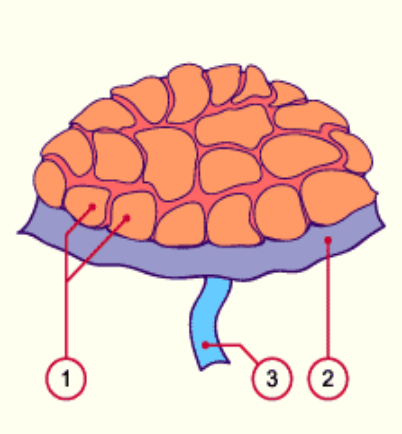
Macroscopic appearance:

The expelled placenta is a discoid mass weighting about 500 gram; its diameter varies from 15 to 20cm and its thickness from 3 to 4 cm near its center rapidly diminishing towards the periphery. Its fetal or inner surface, which is covered by the amnion, is smooth and transparent so that the

mottled appearance of the chorion can be seen through it ,while its maternal surface has a wrinkled appearance, characterized by the cotyledons (fig.1-4) ***(Huppertz, 2008).***

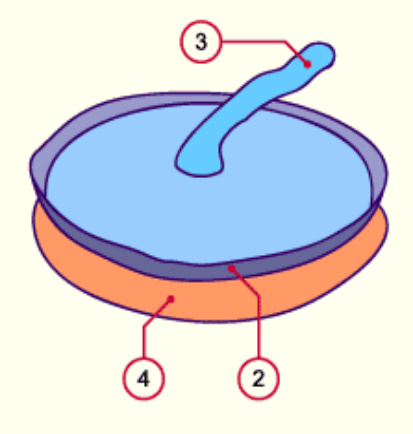
The umbilical cord is usually attached near the center of the placental fetal surface and branches of the umbilical vessels radiate out under the amnion from this point, the veins being deeper and larger than the arteries. Beneath the amnion and close to the attachment of the umbilical cord, the remnants of the yolk sac can sometimes be identified as a minute sac with a fine thread (a vestige of vitello-intestinal duct) attached to it ***(Huppertz, 2008).***

Fig. 1 - maternal side



1 Cotyledon
2 Cut edge of the amnion

Fig. 2 **-** fetal side



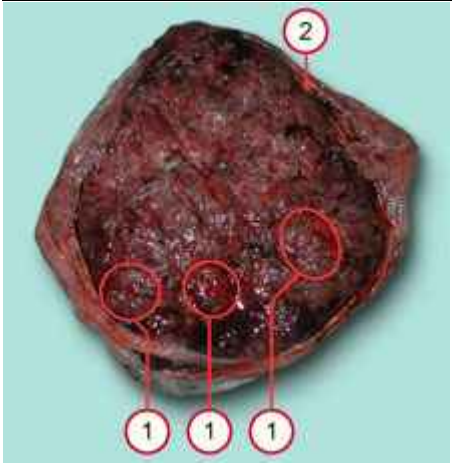
3 Umbilical cord
4 Decidua with the compact layer after the release of the placenta

(Quoted from Huppertz,2008)

Legend

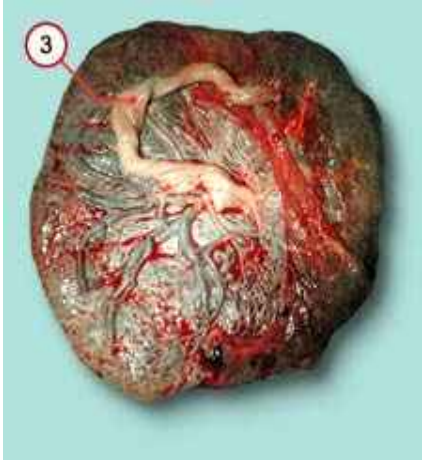
Fig. 1
Placenta: View from the maternal side
Fig. 2
Placenta: view from the fetal side

Fig. 3- Placenta: the maternal side



1 Cotyledon
2 Cut edge of the amnion

Fig 4- Placenta: the fetal side



3 Umbilical cord

(Quoted from Huppertz,2008)

Legend

Fig. 3
From the maternal side the placenta has a wrinkled surface, characterized by the cotyledons.
Fig. 4
From the fetal side, the placenta is smooth and shiny. Notice the normal, central insertion of the umbilical cord in this case.

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Uteroplacental Blood Flow:

The delivery of most substances essential for growth and metabolism of the fetus and placenta, as well as removal of metabolic wastes, is dependent on adequate perfusion of the placental intervillous space. Placental perfusion is dependent on total uterine blood flow, which is principally from the uterine and ovarian arteries. Uteroplacental blood flow increases progressively during pregnancy, ranging from approximately 450 to 650 mL/min near term ***(Bell et al., 1999).***

The flow of placental blood measures up to 600 ml/min and the pressure in the spiral arteries to 70 mm Hg. In the intervillous spaces, the pressure falls to only 10 mm Hg .The blood in the intervillous space is exchanged 2-3 times per minute ***(Pijnenborg et al., 2006).***

Page *et al* (2002) suggested that uterine veins also undergo significant adaptations during pregnancy, specifically remodeling of the uterine veins by numerous factors that include reduced elastin content and adrenergic nerve density, resulting in increased venous caliber and distensibility.

Physiological changes of the placenta during the third stage of labor

Separation of the placenta usually begins with the contraction which delivers the baby's trunk and is completed with the next one or two contractions. As the baby is born, there is marked reduction in the size of the uterus due to powerful contraction and retraction of the uterine musculature. The placental site therefore greatly diminishes in size.

Initially, the mechanism of placental separation was thought to be through the bursting of decidual sinuses under pressure and the subsequent formation of a retro placental blood clot which tears the septa of the spongiosa layer of the decidua basalis, detaching the placenta from the uterine wall **(Brandt 1933).** However, **Dieckman et al (1947)** and more recently **Herman et al (1993)** suggested that separation is caused by