Efficacy of Early Intravenous Infusion of Oxytocin before Induction of Anesthesia in Decreasing Blood Loss During Elective Caesarean Section

A double-blind, controlled, randomized trial

Thesis

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Ahmed El Shorbagy

Contents

List of Abbreviations

Abb.		Meaning
ADH	:	Antidiuretic hormone
AVM		Arteio venous malformation
BC	:	BeforeChrist
c-AMP	:	Cyclic adenosine monophosphate
CBC	:	Complete blood picture
CI		Confodence
CPD		cephalopelvic disproportion
CS	:	Caesarean section
EBL	:	Estimated blood loss
FFP	:	Fresh frozen plasma
GABA	:	Gamma-Amino butyric acid
HELLP	:	Haemolysis, elevated liver enzymes and low platelets
HSV	:	Herpes simplex virus
IM	:	Intramuscularly
IV	:	Intravenous
IRS	:	Institutional review board

Abb.		Meaning
LR	:	Lactated Ringer's
LRS	:	Lactated Ringer's solution
LSCS	:	Lower segment caesarean section
MAP	:	Mean arterial blood
MTCT	:	Mother to child transmission
NICE	:	National Institute for Health and Clinical Excellence
NS	:	Normal saline
PPH	:	Postpartum haemorrhage
PRBCs	:	Packed red blood cells
RFVIIa	:	Recombinant activated factor VIIa
sdNVP	:	Single-dose nevirapine
TOLAC	:	Trial of labor after caesarean
ZDV	:	Zidovudine

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Abstract

Background: Primary post-partum hemorrhage (PPH) is defined as blood loss greater than or equal to 500 ml within 24 hours after birth, while severe PPH is blood loss greater than or equal to 1000 ml within 24 hours. **Aim of the work:** To evaluate efficacy of intravenous infusion of oxytocin administrated at the time of induction of anesthesia before skin incisionin decreasing blood loss during elective cesarean section. **Patienst and Methods:** This is randomized controlled clinical study was conducted at Ain Shams Maternity University Hospital on 300 patients planned for elective lower segment caesarean section. **Results:** Total blood **loss** was significantly lower among group-A than group-B by 144ml, the main difference was intra operative (126 ml). **Conclusion:** The use of earlyinfusion of oxytocin 10 units IV drip via 200 ml of lactated Ringer's over 15 minutes effective in controlling the amount of blood loss during cesarean section and giving a better chance in prevention of atonic post-partum Hemorrhage either infused early or after delivery of the baby. **Recommendations:** Further trials that include patients at higher risk of PPH might provide more evidence for the efficacy of in reducing blood loss in PPH.

Key words: intravenous infusion, oxytocin, induction, Cesarean section

Introduction

Caesarean section (CS) is one of the most commonly performed major operations in women throughout the world ***(Martin et al., 2011).*** In 1985 the World Health Organization stated: "There is no justification for any region to have CS rates higher than 10-15%"***(WHO, 2005).*** Caesarean section rates has increased to as high as 25 to 30% in many areas of the world, because many patients acquire the procedure on request without clinical indication ***(Barros, 2004).***

In Egypt the CS rate is 27.6 %, where more than 50% of deliveries were via CS in last five years (2009-2014)with sharp increase with difference in some areas in delta region and lower Egypt 71%, in upper Egypt 40%, in urban area 70 % and in rural areas 58%***(El-Zanaty et al., 2014).***

Blood loss during cesarean is twice that of vaginal delivery (1000 mL vs 500 mL), in order to reduce maternal mortality and morbidity caused by bleeding, it is important to reduce the amount of bleeding during and after lower segment caesarean section (LSCS) ***(Kambo et al., 2002).***

Postpartum haemorrhage (PPH) remains a leading cause of maternal mortality, especially in developing countries ***(Ronsmans, 2006).*** Early detection of ongoing vaginal bleeding can be detected by deteriorating vital signs measured in the recovery area. In addition to have a high suspicion for ongoing intra peritoneal bleeding when vital

signs are deteriorating in the absence of vaginal bleeding ***(Fawcus and Moodely, 2013).***

For the management of PPH, oxytocin should be preferred over ergometrine alone. If the bleeding does not respond to oxytocin or ergometrine; an oxytocin-ergometrine fixed-dose combination, carbetocin, or misoprostol should be offered as second-line treatment. If these second-line treatments are not available or if the bleeding does not respond to the second-line treatment, a prostaglandin such as carboprost should be offered as the third line of treatment, if available ***(WHO, 2009).***Oxytocin stimulates the upper segment of the myometrium to contract rhythmically, which constricts spiral arteries and decreases blood flow through the uterus ***(Blank and Thornton, 2003).***

In elective CS, administration of oxytocin IV infusion is better, than the same dose administered as a bolus IV dose, to produce adequate uterine contraction and is associated with less adverse hemodynamic changes ***(Susmita et al., 2015).*** Intravenous oxytocin has a very short half -life (4- 10 minutes). Therefore, the potential advantage of an additional oxytocin infusion at caesarean section is that it maintains uterine contractility ***(Bolton et al., 2003).***

Aim of the Work

To evaluate efficacy of intravenous infusion of oxytocin administrated at the time of induction of anesthesia before skin incisionin decreasing blood loss during elective cesarean section.

Research Question:

If early administration of oxytocin infusion before skin incision effective in decreasing blood loss during elective CS?

Research hypothesis:

Null Hypothesis:

Early intravenous infusion of oxytocin before induction of anesthesia is not likely to be effective in decreasing blood loss during elective cesarean section.

Alternative Hypothesis:

Early intravenous infusion of oxytocin before induction of anesthesia is likely to be effective in decreasing blood loss during elective cesarean section.

Chapter (1):

Caesarean Section

Caesarean section (CS) is one of the most commonly performed major operations in women throughout the world,CS has classically been defined as delivery of a fetus through a surgically created incision in the anterior uterine wall. Because caesarean and section both refer to an incision, some prefer the terms caesarean delivery and caesarean birth to describe the procedure. Primary caesarean is the first-time operation, whereas repeat caesarean refers to the operation done after a prior caesarean ***(Berghella and Landon, 2012).***

History of Caesarean section:

The early history of CS remains dubious accuracy. Even the origin of "caesarean" has apparently been distorted over time. It is commonly believed to be derived from the surgical birth of Julius Caesar.It has been stated that Julius Caesar had been delivered by this method ***(Boley, 1991).***

This ismost unlikely as his mother, Aurelia, was still alive at the time of his invasion ofBritain***(Gabert andBey, 1988).***

Historic records that elude to theearliest report of a child who survived caesarean birth is a document describing the birth of Gorgias in Sicily in approximately 508 BCin 1500***(Lurie and Glezerman, 2003).***

In 1500, Nufer is reported to have performed the first successfulmoderncaesareansection, with both the mother and infant surviving. The authenticity of this report is doubtful,

because it was not documented until 82 years after the operation was performed***(Todman, 2007).***

In 1610, Trautmann performed a well-documented caesarean section in Wittenberg. Unfortunately, the patient died from infectious complications on postoperative day 25***(Waszyński, 1994).***

In 1876, Eduardo Porro reported the first caesarean hysterectomy in which both infant and mother survived.The operation consisted of a laparotomy and hysterotomy followed by supracervical hysterectomy and bilateral salpingo-oophorectomy***(Sparićet al., 2012).***

Porro described the case in great detail. The mother was a 25-year-old primigravid dwarf Julia Cavillini who was referred to Porro's clinic in Pavia in Italy because of a suspected malformed pelvis. She had suffered from rickets between the ages of three and ten and during this period was unable to support herself in the erect position without assistance. She was 148 centimetres tall and had the characteristic bony features of rickets including bowlegs, scoliosis and the right iliac crest was four centimetres higher than the left. Porro also noted the pelvis was narrowed in all planes with a diagonal conjugate of seven centimetres. In addition spondylolisthesis of the lumbar spine resulted in a form of roof over the pelvic inlet. He wrote, "It was obvious that absolute disproportion existed and that caesarean section was mandatory"***(Todman, 2008).***

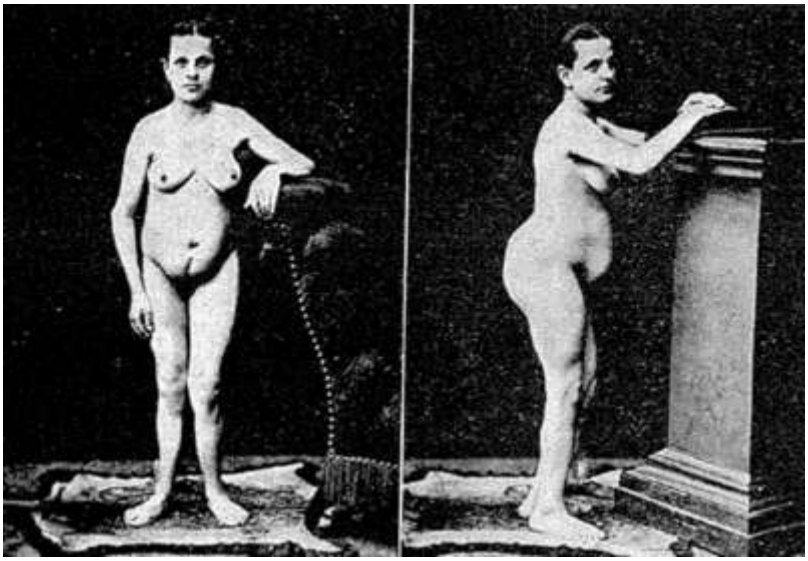

Figure (1): Plate from Porro's paper showing Julia Cavillini in convalescence following Caesarean section***(Todman, 2007).***

The first step toward the caesarean operation as it is currently performed was described Sänger's technique was a median incision of the uterus (the classical incision) and careful stitching of the wound with silver wire suture material. Major advances in the early twentieth century led to further reductions in maternal death from the operation***(McDonald et al., 1996).***

Richardson in the United States performed the first procedure in 1881. This was also undertaken on a young dwarf and he utilised Muller's technique of exteriorizing the uterus. The first successful Caesarean hysterectomy in Great Britain was undertaken by Godson and published in the British Medical Journal as ‘Porro's Operation' in 1884***(Todman, 2008).***

In 1908, Selheim suggested that a uterine incision made in the lower uterine segment rather than the contractile segment of