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Comparison of active and expectant management on the duration of the third stage of labour and the amount of blood loss during the third and fourth stages of labour: a randomised controlled trial

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Abstract
Background: Postpartum haemorrhage is one of the most important causes of maternal death.
Objectives: To evaluate the effect of active management of the third stage of labour on the amount of blood loss in the third and fourth stages of labour, and the duration of the third stage of labour.
Methods: A randomised controlled trial was completed on 200 women who gave birth at a maternity unit in Iran. In the intervention group ($n = 100$), 10 IU of oxytocin was injected intramuscularly into the mother following birth of the anterior shoulder of the baby. After clamping and cutting the umbilical cord, the uterus was pushed upwards and posterior, while the cord was pulled down with constant and intermittent traction until the placenta was delivered. In the control group ($n = 100$), on observing signs of placental separation, the placenta was expulsed by maternal force. In both groups of women, blood loss was measured at birth using collecting devices, and drapes and sheets were weighed to estimate blood loss.
Findings: Mean blood loss during the third stage of labour was 216.93 ± 165.16 ml and 232.12 ± 150.35 ml in the intervention and control groups, respectively; the difference was not significant ($p = 0.49$). In contrast, mean blood loss during the fourth stage of labour differed significantly (422.62 ± 324.7 ml and 327.27 ± 255.99 ml in the intervention and control groups, respectively; $p = 0.02$). The mean duration of the third stage of labour was less in the intervention group than in the control group (4.69 ± 5.51 mins and 6.34 ± 5.03 mins; $p = 0.028$).
Conclusions: Active management did not decrease blood loss during the third stage of labour, but did decrease the duration of this stage. Active management was associated with increased blood loss during the fourth stage of labour. Due to conflicting results between studies, further research should be undertaken to determine the optimal method by which to manage the third stage of labour.
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Keywords Third stage of labour; Fourth stage of labour; Postpartum haemorrhage; Active management; Placental expulsion; Oxytocin; Expectant management; Physiological management

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Introduction

Postpartum haemorrhage (blood loss of $\geqslant$500 ml in the first 24 hours postpartum) is an important cause of maternal death and occurs in approximately 4% of vaginal deliveries (Maughan et al., 2006). Postpartum haemorrhage causes significant maternal morbidity and is associated with one-quarter of all maternal childbirth-related deaths globally (Gabbe et al., 2002).

Most cases of postpartum haemorrhage are caused by uterine atony, and one of the important risk factors for atony is prolongation of the third stage of labour (Combs et al., 1991). For this reason, prophylactic use of uterotonic drugs and active management of the third stage of labour have attracted considerable attention (Prendiville et al., 1988). The third stage of labour is the time from birth of the baby until delivery of the placenta. The volume of birth-associated blood loss depends on how long it takes the placenta to separate from the uterine wall, and how effectively the uterine muscle contracts in the immediate postpartum period (Maughan et al., 2006).

Active management of the third stage of labour refers to the administration of uterotonic medication to the mother after birth of the baby, early clamping and cutting of the cord, and controlled traction on the umbilical cord while awaiting placental separation and delivery. In contrast, expectant management of the third stage of labour (i.e. physiological management) is best described as a 'hands off' approach. The umbilical cord is not clamped or cut until it stops pulsating, separation of the placenta occurs without intervention, and the placenta is delivered spontaneously or aided by gravity (Prendiville et al., 2000).

In most studies which have compared these two types of management (Khan et al., 1997; Rogers et al., 1998; Prendiville et al., 2000; Brucker, 2001), active management has been shown to reduce the duration and the amount of blood loss during the third stage of labour. However, one study (Thilaganathan et al., 1993) showed that although active management decreased the duration of the third stage of labour, the amount of blood loss was not reduced in comparison with expectant management in women at low risk for postpartum haemorrhage. This study evaluated 193 women with spontaneous vaginal birth at term. Ninety women had physiological management and blood loss was measured objectively by comparing haemoglobin in labour with that on the third postpartum day. Due to the conflicting results between studies, it seemed that additional studies should be performed to determine the optimal method by which to manage the third stage of labour.

The purpose of the present study was to compare the effect of active and expectant management on the amount of blood loss during the third and fourth stages of labour, and also on the duration of the third stage of labour.

Methods

This study was conducted at Fatemieh Hospital in Hamedam, Iran, between April and August 2004, and was approved by the hospital ethics committee. All women admitted to the labour ward ($n = 1032$) were evaluated for eligibility for this trial (Fig. 1). Eligible women ($n = 738$) were invited to participate in the study. Written informed consent was obtained from all participants. Inclusion criteria included the following: gestational age between 37 and 42 weeks; singleton pregnancy; live fetus; cephalic presentation; neonatal birth weight of 2500–4000 g; parity between one and five; maternal age $<$35 years; and vaginal birth. Exclusion criteria included the following: blood pressure $\geqslant$140/90 mmHg; placenta previa; placental abruption; a history of any bleeding during pregnancy; a history of curettage; caesarean section or any uterine scar; a history of postpartum haemorrhage; polyhydramnios; rhesus-negative blood group; signs or symptoms of maternal infection; prolonged rupture of membranes; known uterine anomalies; history of any drug use during labour; abnormal placentation (accreta, inccreta or perccreta); coagulation defects; instrumental deliveries; analgesia or anaesthesia for birth; haemoglobin concentration $<$11 g/dL; history of anticoagulant drugs; beta-mimetic medications during pregnancy; and prolongation of the first stage of labour $>$15 hours. Three hundred and fifty-two women who fulfilled the inclusion criteria on admission to the labour ward were assigned at random to the two groups using block randomisation. The letters 'A', 'B', 'C' and 'D' were allocated to sealed, sequentially distributed envelopes: 'A' and 'C' represented active management (intervention group) and 'B' and 'D' represented physiological management (control group). Each woman chose an envelope which was opened by the investigator, and according to the letters, the women were assigned to either the intervention group or the control group. One hundred and fifty-five women were allocated to the intervention group and 145 women to the control group. The women were followed from the time of birth to the

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