Research Journal of Medical Sciences 1 (3): 157-160, 2007

Effect of Atropine in Arrest of Dilatation and Descent

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Abstract: Active-phase arrest defined as 1 cm or less of cervical change over 2 h in the active-phase of labor. The aim of this study was determine the effects of atropine for induction of labor in arrest of labor. In a clinical trial study, we evaluated 120 nullipar, singleton and term delivery with anterior cephalic presentation and arrest of dilatation in Al-Zahra hospital since 2004 to 2005. Patients divided to four group's randomizly. Group A as a control group don't received any induction methods, group B and D received atropine with dose 0.01 mg kg^{-1} intravenously. Amniotomy was performed in group C and D. The mean time period from labor induction to full dilatation and vaginal delivery was 220.29±7.22, 165.48±56.53,169.11±52.53 and 159.44±71.56 min in groups A,B,C and D, respectively ($p = 0.002$). Vaginal delivery rate was 93.3, 96.6, 93.3 and 90% in group A, B, C and D, respectively. Atropine at the same of the amniotomy was affective in treatment for arrested labor but vaginal delivery duration in control group was significantly larger than the other groups. Cesarean section rate in atropine group was lower than other groups. Using atropine plus amniotomy for induction of labor don't recommend.

Key words: Labor induction, arrest of labor, atropine, dilatation and descent, active phase arrest

INTRODUCTION

Normal labor progresses slowly during the latent phase. Then, active phase of labor, which progress faster, begins after 4 cm dilatation more rapidly (Cunningham *et al*., 1997).

During active labor (after 4 cm), the cervix should progressively dilate at a rate of 1.2 cm h^{-1} (for nulipar) to 1.5 cm h^{-1} (for multipar) (Cunningham *et al*., 1997). Active-phase arrest defined as 1 cm or less of cervical change over 2 h in the active-phase of labor (Rouse *et al*., 1994). The incidence of active-phase arrest was 4.9% and hypotonic forces were diagnosed in 81% of the cases (Handa and Laros, 1993).

Inadequate force can be described when abnormal uterine contraction prevents normal progress of cervical dilatation, effacement and descent (Cunningham *et al*., 1997; Handa and Laros, 1993).

Abnormal labor of the second stage often is becomes of problems with one of the 3 ps:

- Passenger (infant size and fetal presentation, e.g., in cephalic-occiput anterior or occiput posterior vs. breech or transverse).
- Pelvis or passage (size and adequacy of the pelvis).
- Power (uterine contractility) (Creasy *et al*., 1999).

Prolonged latent phase may be the result of over sedation or upon entering labor early with a thickened or unaffected cervix (Gifford *et al*., 2000). Both maternal and fetal mortality and morbidity rates increase with abnormal labor. This is probably an effect-effect relationship rather than a cause-effect relationship. Nonetheless identifications of abnormal labor and initiation of appropriate actions to reduce the risks are matters of some urgency (Gifford *et al*., 2000). After an active-phase arrest, cesarean delivery increased (Handa and Laros, 1993). After repeat cesarean, lack of progress in labor (also known as dystocia or failure to progress) is the second most common reason for cesarean delivery in the United States, accounting for 30% of nearly one million cesareans performed annually (CDC, 1995). Approximately 294,000 cesareans are performed in the united state each year for lack of progress in labor (CDC, 1995).

Marpeau study results suggest that occiput position and functional dystocia are more common in case of nonprogressive labor than abnormal measurements of the obstetrical pelvis (Marpeau *et al*., 2002). The following obstetric risk factors were significantly associated with arrest of dilatation and descent were nulliparity, birth weight >4 kg, epidural analgesia, hydramnios, hypertensive disorders, gestational diabetes A1 and A2, male gender, premature rupture of membranes and induction of labor (Feinstein *et al*., 2002).

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The aim of this study is to determine the effect and efficacy of atropine vs amniotomy in progressing cervical dilatation and neonate's outcome in nulipar women with arrest of dilatation.

MATERIALS AND METHODS

A clinical trial study has been performed on 120 nullipar women with arrest of dilatation in Al-Zahra hospital since 2004 to 2005.

Inclusion and exclusion criteria: Inclusion criteria included nullipar women, 37-42 weeks gestation, intact membranes and no fetal or maternal contraindication to trial of labor, no prior cervical ripening with prostaglandins, no intrauterine infections or other contraindication for antimicrobial treatment.

Exclusion criteria included non vertex presentation, previous cesarean, heart disease, multiple gestation and a non reassuring fetal heart rate tracing or chorioammionitis at the time of labor arrest.

Patients divided to four groups randomly:

Group A: Received none of induction methods as a control group.

Group B: Received atropine with dose 0.01 mg kg^{-1} intravenously.

Group C: Amniotomy has been done.

Group D: Received atropine with dosage plus amniotomy.

Size of cervical dilation measured at 0-5 h after induction of labor. Other information such as time of vaginal delivery, cesarean section rate, infants Apgar has been collected. No significant difference was found between mean of cervical dilation at the time of beginning induction and all groups wear compared from this point of variable.

Statistical analysis: All information entered to computer and used SPSS ver. 11.5 soft ware for Windows and used ANOVA test for analysis of data and $p<0.05$.

Ethical: Different methods of induction of labor were explained to all women and kept letter of satisfaction.

RESULTS

The clinical findings of cervical dilation in four groups are shown at Table 1.

Based on Table 1, dilation progress in amniotomy group (group C) at one hour after induction was significantly higher than other groups at the same time. This indicates, amniotomy individually in induction of labor has stronger effect than the other induction methods, but this difference in subsequent hours is not significantly different among groups. Significant differences were not found among four other groups for dilatation progress and dilation size at 1-4 h after induction. Cesarean section was done on eight women due to no progressed dilation.

The frequency of cesarean section among groups is showing in Fig. 1. The mean of vaginal delivery duration is showing in Table 2.

The mean of vaginal delivery duration is significantly higher in group A (control group) than in other three groups, but no significant difference is found among groups in vaginal delivery duration.

The mean of dilation progressive speed is shown at Table 3.

Neonatal Apgar was 8-10 in all neonates and no significant difference is found in Apgar score among four groups.

Table 1: Mean and Std. deviation of dilatation size between groups

	Number	Group A (control)	Group B	Group C	Group D	P-vaules
Induction time(*cm*)	120	4.4±0.4	4.6±0.7	4.7±0.5	4.5±0.6	0.116
1 h (cm)	119	5.5±1.3	6.4±1.6	6.8±1.4 *	6.4±1.9	0.015
2 h (cm)	106	7.5±1.9	8.2±1.8	8.2±1.3	7.2±2.2	0.112
3 h (cm)	83	8.4±1.6	9.0±1.8	9.6±0.6	8.3±2.1	0.065
4 h (cm)	38	9.3±1.1	8.7±2.8	10±0.0	8.8±2.3	0.537
5 h (cm)	9	10±0.0	7.5±3.5	-	10±0.0	0.178

Mean±Std. deviation, *- Significant ($p<0.05$)

Table 2: Mean + Std. deviation of vaginal delivery duration (minute)

	Number	Mean	Std. deviation
Group A*	28	220.29	77.225
Group B	29	165.48	56.537
Group C	28	169.11	52.530
Group D	27	159.44	71.567
Total	112	178.63	68.725

*-Significantly higher ($p = 0.002$)

Table 3 : Mean + Std. Deviation of vaginal delivery speed (Cm h^{-1})

	Groups							
	Group A		Group B		Group C		Group D	
Dilatation speed	Mean	Std. deviation	Mean	Std. deviation	Mean	Std. deviation	Mean	Std. deviation
Hour 0 to 1	1.14	1.05	1.75	1.41	2.14	1.26	1.82	1.76
Hour 1 to 2	2.07	1.56	2.04	1.11	1.82	1.10	1.38	1.28
Hour 2 to 3	1.33	1.38	1.58	1.22	1.76	1.06	1.67	1.11
Hour 3 to 4	1.65	1.25	1.58	1.59	1.00	.00	1.95	1.32
Hour 4 to 5	1.92	1.11	1.50	.71	.	.	1.50	.

*-No Significant

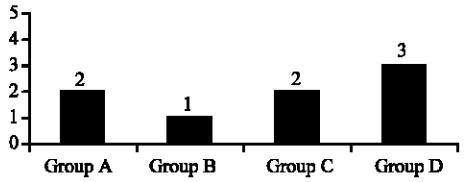

Fig. 1: Frequency of cesarean section

DISCUSSION

Atropine increased uterine activity, whereas a similar pattern of uterine hyperactivity occurred following injection of oxitocine (Raynall and Houdeau, 2004).

In our study, we used atropine on women with arrested cervical dilation for progressing dilatation, therefore, its effectiveness was increasing uterine activity and progressing cervical dilation and it was as effective as amniotomy and oxytocine.

It seems possible to reduce operative rates for arrest disorder of labor safely by much extensive use of medical management (Bottoms *et al*., 1987).

At the present study, we compared the effect of atropine and amiotomy in progressing dilatation and it was observed that atropine was effective, in progressing dilation on women with arrest of dilation, as a medical management.

During oxytocine augmentation by Rouse (1999) none of their infants sustained any serious complication.

In our study, after induction of labor with atropine, none of them has any serious complication and all first minute Apgar were 8-10.

Benoussaidh *et al*. (2005) indicated that doses of 0.3-300 ng of oxitocine increase frequency and amplitude of uterine contractions.

In our study, as the same of the oxitocine, after induction with atropine or amniotomy in all women frequency and amplitude of uterine contractions was increased.

Uterine activity is increased by receiving 0.01 mg kg^{-1} of atropine and as well as maternal heart rate was increased significant changes in maternal blood pressure accrued (Abboud *et al*., 1983). In our study, also Atropine increased uterine activity and dilation progress. I.V. administration of 0.1 mg atropine has similar efficacy to amniotomy for labor induction with arrest of dilatation. At the present study, significant difference was not found between efficacy of atropine and amiotomy for induction of labor and our finding either.

Artificial insemination in the ewe increases uterine motility, resulting from the reflex activation of adrenergic and cholinergic nerve fibres of the autonomic nervous system, following by a reflex release of Oxytocin (OT) from the pituitary gland (also called "Ferguson reflex"). This secretion of OT was elicited by the excessive dilation of the vaginal wall with the speculum. By comparison, mating did not evoke a period of uterine hyperactivity and respects the physiological post-coital resting period (Raynel and Houdeau, 2004).

In our study, induction of labor with atropine in comparison to other methods of labor induction labor such as amniotomy and oxytocine was one of the effective methods that result to progressive cervical dilatation and decrease cesarean section rate in women with arrested labor. Although no significant difference was found between dilatation progressive speeds but cesarean section rate in atropine group (group B) was lower no significant than in other groups and duration of vaginal delivery in group B was lower than in control group.

We can use atropine for augmentation of labor as an effective and safe alternative to amniotomy because of amniotomy is not risk free and can increase the incidence of abnormal fetal heart rate patterns.

CONCLUSION

Several methods were used for induction of labor and using one of them was controversy. Using atropine for induction was one of new induction methods. Based on the received results, although no significant difference was found among groups but vaginal delivery duration in each three groups (group B, C and D) significantly was lower than control group (group A).

Cesarean section rate in group B (atropine group) was lower than other groups. Because of high cesarean section rate and increased infant risk using atropine plus amniotomy for induction of labor this combination is not recommended.

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