

APPENDIX C

SUMMARY OF RESEARCH COMPARING OXYTOCIN DOSAGES AND INTERVALS

Author (Date)	Study Design	Sample Size	Initial Dose	Incremental Dose	Interval Between Doses	Results/Conclusions
Foster et al. (1988)	Retrospective	N = 174 n = 92 n = 82	1 mU/min 1 mU/min	1 mU/min 1 mU/min	15 min 30 min	There were no differences in length of labor or cesarean delivery between groups. The maximum dosage of oxytocin was significantly lower in the 30-minute interval group. The 30-minute interval group also had the oxytocin infusion discontinued for evidence of uterine hyperstimulation and/or abnormal FHR tracings significantly less often than did the 15-minute interval group. Longer interval dosing does not increase the length of labor but does decrease the incidence of hyperstimulation.
Wein (1989)	Retrospective	N = 1,020 n = 110 n = 338 n = 572	0.7 mU/min 1.7 mU/min 3.3 mU/min	1.3 mU/min 3.3 mU/min 6.7 mU/min	30 min 30 min 30 min	There were no differences in the mean induction to birth time between groups, or the rate of cesarean delivery. One-minute Apgar scores were lower in infants of women receiving the higher dose. The higher dosages resulted in a higher total dose of oxytocin; in some cases as high as 168 mU/min. There is no benefit to using higher initial doses and higher incremental doses of oxytocin for induction of labor. Low dose is effective and associated with fewer hazards such as hyperstimulation.
Blakemore et al. (1990)	RCT	N = 52 n = 26 n = 26	0.5 mU/min 0.5 mU/min	2 mU/min 4 mU/min	15 min 60 min	More patients on the hourly protocol either had oxytocin discontinued completely or were maintained at 4 mU/min or less during the active phase of labor. A slower rate of increase in oxytocin administration results in no prolongation of any phase of induced labor, while permitting low infusion rates of the drug.
Chua et al. (1991)	RCT	N = 224 n = 112 n = 112	2.5 mU/min 2.5 mU/min	2.5 mU/min 2.5 mU/min	15 min 30 min	The mean length of labor was similar in both groups. There were more instances of decreasing or discontinuing the oxytocin infusion for hyperstimulation and/or FHR changes in the 15-minute group. There was no advantage to the shorter dosage interval of 15 minutes as compared with 30 minutes.
Mercer et al. (1991)	RCT	N = 123 n = 62 n = 61	0.5-1 mU/min 0.5-1 mU/min	2-4 mU/min 2-4 mU/min	20 min 60 min or more	Length of labor was similar in both groups. Cesarean delivery and cesarean delivery for fetal distress was more frequent in the 20-minute group. Continuous low-dose oxytocin is effective in establishing active labor and achieving vaginal birth. The 20-minute group had a higher frequency of episodes of uterine hyperstimulation and required more adjustments in the rate of oxytocin infusion than did the 60-minute group.
Satin et al. (1992)	Retrospective Evaluation of a change in unit policy	N = 2,788 n = 1,251 n = 1,537	1 mU/min 6 mU/min	1-2 mU/min 6 mU/min	20 min 20 min	Uterine hyperstimulation was more common in the high dose group and was associated with a significantly increased incidence of cesarean delivery for fetal distress. Cesarean delivery for dystocia was decreased in the high dose group. High dose oxytocin for labor induction is problematic and creates a risk-benefit dilemma. One to one nursing care with the nurse in continuous attendance at the bedside was required.
Muller et al. (1992)	RCT	N = 151 n = 76 n = 75	1-2 mU/min 1-2 mU/min	1-2 mU/min Doubled	30 min 40 min	Larger dose increments shortened time from induction to active labor but did not shorten time from induction time to birth. There were more nonreassuring FHR patterns and more operative births in the large dose increment group. Incidence of uterine hyperstimulation was not different between groups.
Lazor et al. (1993)	RCT	N = 865 n = 487 n = 378	1 mU/min 1 mU/min	1-2 mU/min 1.5-3 mU/min	15 min 40 min	A dosing interval of 40 minutes led to lower incidences of uterine hyperstimulation and fetal distress and decreased the maximum dose of oxytocin without affecting the length of labor or the cesarean delivery rate. A 40-minute dosing interval may be clinically safer than 15-minute dosing.

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Author (Date)	Study Design	Sample Size	Initial Dose	Incremental Dose	Interval Between Doses	Results/Conclusions
Orhue (1993a)	RCT	<i>N</i> = 245				The 30-minute incremental regimen resulted in fewer precipitous labors, less uterine hyperstimulation, less postpartum hemorrhage, less intrapartum fever, fewer perineal tears, and a reduced hospital length of stay. The 30-minute group had a longer time from start of induction to birth. Oxytocin infusion regimens with 30-minute incremental increases are safer than 15-minute infusion regimens.
		<i>n</i> = 122	2 mU/min	Doubled	15 min	
		<i>n</i> = 123	2 mU/min	Doubled	30 min	
Orhue (1993b)	RCT	<i>N</i> = 90				The 45-minute incremental regimen resulted in fewer precipitous labors, less uterine hyperstimulation, less postpartum hemorrhage, less intrapartum fever, fewer perineal tears, fewer uterine ruptures (0 vs. 3), and a reduced hospital length of stay. The 45-minute group had a longer time from start of induction to birth. Oxytocin infusion regimens with 45-minute incremental increases are safer than 15-minute infusion regimens.
		<i>n</i> = 44	2 mU/min	Doubled	15 min	
		<i>n</i> = 46	2 mU/min	Doubled	45 min	
Orhue (1994)	RCT	<i>N</i> = 124				The 30-minute incremental regimen resulted in less fetal distress, fewer precipitous labors, less uterine hyperstimulation, less postpartum hemorrhage, less intrapartum fever, fewer perineal tears, and a reduced hospital length of stay. There were more cesarean deliveries in the 15-minute group.
		<i>n</i> = 62	2 mU/min	Doubled	15 min	
		<i>n</i> = 62	2 mU/min	Doubled	30 min	
Safin et al. (1994)	Retrospective Evaluation of a change in unit policy	<i>N</i> = 1801				A 40-minute dosing interval for high-dose oxytocin offers no clear advantage over a 20-minute interval; however, the 20-minute interval had fewer cesarean deliveries for dystocia while the 40-minute interval had fewer episodes of uterine hyperstimulation. One-to-one nursing care with the nurse in continuous attendance at the bedside was required.
		<i>n</i> = 949	6 mU/min	6 mU/min	20 min	
		<i>n</i> = 852	6 mU/min	6 mU/min	40 min	
Goni et al. (1995)	RCT	<i>N</i> = 100				Induction oxytocin infusion regimens with increments at 60 minutes are safer than and equally effective as 20-minute incremental intervals. The time from induction initiation to birth was not significantly different between groups; however, there were more cesarean deliveries, operative vaginal deliveries, uterine hyperstimulation, and nonreassuring FHR patterns in the 20-minute group when compared with the 60-minute group.
		<i>n</i> = 50	1 mU/min	Doubled	20 min	
		<i>n</i> = 50	1 mU/min	Doubled	60 min	
Hourvitz et al. (1996)	RCT	<i>N</i> = 179				Induction with higher-dose oxytocin increments did not shorten the time interval from induction to birth but was associated with a significant increase in uterine hyperstimulation, significantly more nonreassuring FHR patterns, and significantly higher mean peak doses. Low-dose oxytocin is appropriate and safe for labor induction.
		<i>n</i> = 81	1.25 mU/min	0.25 mU/min	30 min	
		<i>n</i> = 98	2.5 mU/min	2.5 mU/min		
Merrill & Zlatnik (1999)	RCT	<i>N</i> = 1307				The high-dose oxytocin group received significantly more oxytocin and higher maximum doses (up to 117 mU/min) than the low-dose group. There was a higher incidence of decreasing and discontinuing the oxytocin for hyperstimulation with fetal distress in the high-dose group. The high-dose group had a significantly shorter labor. There were no differences in the cesarean delivery rate between the groups. Letters to the editor by the authors answered criticism that the statistical analyses overestimated the effect on the length of labor and underestimated complications by clarifying and recalculating their data.
		Induce				
		<i>n</i> = 412	1.5 mU/min	1.5 mU/min	30 min	
		<i>n</i> = 404	4.5 mU/min	4.5 mU/min	30 min	
		Augment				
		<i>n</i> = 242	1.5 mU/min	1.5 mU/min	30 min	
		<i>n</i> = 249	4.5 mU/min	4.5 mU/min	30 min	
Crane & Young (1998)	Meta-analysis comparing low vs. high dose oxytocin for labor induction	11 RCTs				Low-dose protocols resulted in fewer episodes of excessive uterine activity/hyperstimulation, fewer operative vaginal deliveries, a higher rate of spontaneous vaginal birth, and a trend toward a lower rate of cesarean delivery. The low-dose groups had lower rates of postpartum maternal infection and postpartum hemorrhage. Induction of labor with the minimal dose of oxytocin to achieve active labor and increasing intervals no more frequently than every 30 minutes is appropriate.

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Daniel-Spiegel et al. (2004)	RCT	N = 104				Continuation of oxytocin past 5 cm cervical dilation (active labor) did not result in any clinically significant benefits, and the group that had oxytocin continued had more uterine hyperstimulation and twice as many cesarean deliveries. In the group in which oxytocin was discontinued at 5 cm cervical dilation, labor was shorter. There is no advantage to continuing oxytocin after the onset of active labor.
		n = 52	1 mU/min	1mU/min up to 5 cm cervical dilation, then no further increases	20 min	
		n = 52	1 mU/min	1mU/min up to 5 cm cervical dilation, then discontinued	20 min	

Abbreviations: FHR, fetal heart rate; RCT, randomized controlled trial.